Wing

1651

56,163/c

LIBENTER AC LIBERE.

Joseph William Dunning

5

HARMONICON COELESTE:

OR,

The Cœleſtiall Harmony of the

VISIBLE WORLD:

CONTEINING,

An abſolute and entire Piece of

ASTRONOMIE.

WHEREIN

Is ſuccinctly handled the *Trigonometricall* Part,
generally Propounded, and particularly Applyed in all Queſtions
tending to the *DIURNALL MOTION.*

Eſpecially reſpecting, and truly ſubſervient to the
main Doctrine of the Second Motions of the *Luminaries* and the
other *Planets*: Together with their Affections
as ECLIPSES, &c.

Grounded upon the moſt *Rationall Hypotheſis* yet
Conſtituted, and compared with the beſt Obſervations that are
Extant, eſpecially thoſe of TYCHO BRAHE, and other
more Modern *OBSERVATORS.*

Fitted to the *Meridian* of the moſt Famous and Ancient *Metropolis*
LONDON, and principally intended for our Engliſh Nation, and
commended as uſefull to all *Schclers*, *Aſtronomers*, *Aſtrologers*,
Divines, *Phyſitians*, *Hiſtoriographers*, *Polititians*,
and *Poets*, *&c.*

By VINCENT WING. *Philomathemat.*

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*Quum reſpicio Cœlos tuos, opus digitorum tuorum; Lunam & Stellas quas ſtatuiſti: quid
eſt mortalis, quòd memor ſis ejus? aut filius hominis, quòd viſites eum?* Pſal 8.4,5.

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To The Right HONOURABLE BAPTIST, Lord Noell, VISCOUNT CAMPDEN,

RIGHT HONOURABLE:

I Dare not (as thoſe un-naturall Heathens deal with their Infants, who as ſoon as they are come into this *Venter*, their paſſage into another *World* by an unwarranted *Baptiſm*) commit theſe *Productions* of my *Pen* to the wide *Ocean* of fluctuating *Opinions*, without the aſſurance of ſome faithfull *Pilot*, and the protection of ſome *Honourable Perſonage* as your *Self*; without the which it might happily appear *miſ-ſhapen* and *monſtrous* to the *eye* of the *World*, and un-eaſily eſcape *Submerſion*: if moſt mens judgements act the part of blinde *Fortune*, which (as *Saluſt* tels us) *Res cunctas ex lubidine magis quam ex vero celebrat, obſcuratq;* eſpecially if that be true, which the learned *Verulam* ſaith; *Tempus ſimile eſt Fluvio, qui levia atq; inflata devolvit, ſolida autem &*

pondus habentia ſubmergit, I muſt neceſſarily embrace *Virgils* counſell,

> *Principio ſedes apibus ſtatioq; petenda*
> *Quo neq; ſit ventis aditus*———

Since that as the *Yeare* conſiſting of more *foul* then *fair* days, ſo the *World* in truth accounts more bitter blaſts and virulent cenſures of *Detraction* then *candid, ſerene*, and *unprejudiced* judgements; I muſt repair to your *Honour, Lumen, collumenq; meum*, as to *Seths* Pillars, which in deſpight of whole *Torrents* of Oppoſers and *Catarracts* of *Zoilus* his furious Off-ſpring, will *media inter prælia*, ſecure theſe my poor Labours and perpetuate them, as indeleble as the *Stars*, or your *Lordſhips Honour*, and may ſing with *Homer*, 12 *Odyſ.*

> ———ἔπειγε γὰρ οὖρος ἀπήμων.
> Αὐτίκ' ἔπειτ' ἄνεμος μὲν ἐπαύσατο ἡ δὲ γαλήνη.
> Ἔπλετο νηνεμίη;

Urgebat enim ventus innoxius, ſtatim deinceps ventus quievit, atq; tranquillitas erat cum venti ſilentio. What other enforcements emboldned me to preſent theſe my pains, the Poet ſhall anſwer for me:

> ———*Natale ſolum dulcedine cunctos*
> *Ducit; & immemores non ſinit eſſe ſui.*

It may not detract from Your *Honour* to *Chriſten* a poore *Neighbours Childe*, which may not unlikely be the *Father* of much *advantage* to the *Publique* The *Penny* is ſtampt with the *Kings Impreſſe*, as well as the faireſt *Jacobus*. If You will be pleaſed to *own* the *Dedication*, You will doubtleſſe, by the *Honourable Patronage*, evince the *currencie* of the *matter*, that it is *genuine* and *in-adulterate*, and in the eſtimation of the moſt *knowing Men*, to be *aerei mellis Cœleſtia dona.*

Your Lordſhips moſt humble and
faithfull Servant,

Vincent Wing.

TO THE JVDICIOVS READER:

'ΑΛΗΘΕΝΕΙΝ.

GOD Almighty, whom the ancient Philoſopher *Triſmegiſt*, did wittily deſcribe to be [*intelligibilis Sphæra, cujus centrum ubique, circumferentia nullibi*] as he is the firſt beginning, ſo is he the ultimate end of all created beings, amongſt which, by an harmonious ſubordination of ends, ſome are diſpoſed more immediately, others more remotely, to the Glory of his eternall Eſſence, above all the rationall being, man may challeng the ſuperiority, though much impaired in his faculties by the primitive lapſ, that he can naturally ſee this ſupream, infinite being in the Glaſſe of the Creatures, which do reflect to Him that Infinitely Divine Wiſdom, which he cannot perceive directly, but (as *Moſes*) his back parts onely, *& ex poſteriori*. A principall view hereof, the Stars, thoſe heavenly Bodies, will eaſily exhibit, that by diſcourſe, contemplation, and evident demonſtration of their indefinite magnitude and multitude, tranſcendent beauty and luſtre, and their admirable order, can forcibly reaſon us to conclude: τὰ ἀόρατα τοῦ Θεοῦ, a moſt Immenſe, Infinite, Beautifull and Wiſe God. For as he argues well of a curious *Architas*, from his admirable artifice; of a wiſe *Pater-familias* from the ſweet decorum of his family, of a potent Lord from the great extent of his poſſeſſions, ſtately buildings, &c. ſo by a more juſt analogie *cæteris Paribus*, upon the meditation of an immenſe extended Space, and herein a more ſtately Fabrick the World, conſiſting of innumerable Variety, conſtant and ſtupendious Order, of vaſt conſpicious Bodies, I ſay, ſuch an Oeconomy deeply conſidered, cannot but ſuffix a *Quod erat demonſtrandum*, to the Omnipotency and tranſcendent Glory of the Creatour. Hence it is, that *Philo* the Jew, in his book *de Mundi opificio*, ſaith, that man was placed here by his Maker, as upon a Theatre, to look upon thoſe uniforme and various Spectacles; hence *Plato* ſaith, we have our Eyes, and *Ovids: Os homini ſublimè dedit cœlumquè tueri*. That through thoſe Caſements, the Cœleſtiall Species may be tranſmitted to the underſtanding, to raiſe high meditations of our God. Truly, worthy, therefore of your entertainment is this Science, *viz. Aſtronomy*, which leads you by the hand, as it were, to ſo an ineſtimable treaſure, and (as the learned *Dee* once ſaid) lifteth the heart above the Heavens by inviſible Lines, and immortall Beams, meeteth with the reflexions of light incomprehenſible, and ſo procureth joy and perfection unſpeakable. *Fœlices animæ quibus hæc cognoſcere primum*, ſings the Poet. But leſt I ſhould ſoar too high in this too curious ſearch, I will levell my pen in the brief inquiry of the ſpeciall uſes and apparent influences this art chalengeth in humane affairs. How many *Chimæra's* and falſe concluſions may it happily diſcover in Naturall Philoſophy, that part *de Cœlo*, wherein they maintain a matter ſpecifically divers from that of the inferiours, that form πεντουσία, and ſtrange affections, that they are impervious or ſolid, and conſiſt of almoſt innumerable Orbs. Theſe and many other enormious Tenents of the Peripatetick, the pure Aſtronomer laughs at as meer figments of Mans brain, or *Entia rationis*, as they call them. Do you ſeek for any competent knowledg in Chronology? repair hither, where you muſt have the *principia conſtitutiva* of the Art, the Characters, *quæ temporis conſtituunt fines audaciæ computatorum, Scal.* What immediate aſſiſtance doth it afford to Geography? without which the Difference of Longitude could never be found out. I could go further, and humbly tell the religious, learned, and painfull Divine, he cannot cleerly underſtand ſome texts of Scripture, as the firſt Chapter of *Geneſis*, and many other places without ſome helps from us. Let the pretenders to the ſpirit of Revelation, and contemners of humane Learning, which (as the glory of *Oxford* Univerſity Mr. *Gregory* obſerves) are all Comments and Notes upon the holy Book, let them tell me what *Ahaz* his Diall was, and the meaning of the retroceſſion of the ſhadow, *2 Kings, Chap.20.* if onely the ſhadow, I ſay, that it is no miracle, in ſome kind of Dials, as *Clavius* and *Nonius* do obſerve, let them tell me again, what is meant by that, that darkneſſe ſhould be upon the face of the Earth, and no Aſtronomer of all that Hemiſphere, except at Hieruſalem perceive it? If I would be extravagant, I could puzzle their infuſed gifts with that *13 Chap.* of *Revel. ult.* and make them betray their own ignorance, but I'le pretermit thoſe iron-ſouls, and ſalute the Phyſician, who, I dare boldly ſay, wants his right hand, if he be ignorant herein: May I give the Polititain ſome helps from this, let them take the Type or Draught of an admirably compoſed Government, the Sun and his attendants, the Sun like a King in his throne adminiſtring Light and Heat, they, again, in their ſeverall capacities, by a grateful reflexion, reciprocally returning the ſame benefits to him, and mutually to one another. Of what conſequence it is in Navigation and Husbandry, I need not expreſſe, becauſe it is ſo commonly known: *Seneca* makes it catholickly uſefull. *Quam juvat inter Sydera ipſa* (ſaith he) *vagantem divitum pavimenta ridere & totam cum auro ſuo terram.* And a little after; *Hoc enim punctum quod inter tot gentes ferro & igni dividitur, O quam ridiculi ſunt mortalium termini! punctum ſanè enim illud in quo navigamus, in quo bellamus, in quo regna diſponimus:* Lift up thy Eyes therefore unto thoſe higher Manſions, aud more glorious Objects of thy actions.

Now, that, happily I have gain'd my good Readers affection to this Art, I ſhall next endevour to reduce *in breviſſimam quaſi tabellam*, the hiſtory of this famous Art, whereby I may further illuſtrate the worth of it, by obſerving to him, how it hath been ſtudied and practiſed by the moſt civill Nations of the World, the greateſt Princes, and moſt famous Sthollers, and how by an interrupted tract it hath been deduced to us with a continued addition of new experiments: for *ad inquiſitionem tantorum una ætas non ſufficit, ut tota Cœlo vacaret. Sen. Lib. 3. Nat. Quæſt.* That it had its originall with *Adam*, I verily believe, and ſo imparted to *Seth*, (whom *Joſephus* mentions to have erected, (upon a Propheſie from *Adam*, that the World ſhould be firſt drowned, then burned) two Pillars for the eternizing of it, thence by a lineall ſucceſſion of the ante-diluvian Fathers, it was communicated to *Noah*, who doubtleſſe had a great meaſure of knowledg in the performance of that wonderfull *Machina* the Ark, which was neer 100 years in building, from him it deſcended to the Patriarch *Abraham*, who inſtructed (although, *Lucian* declareth the Æthiopians to have delivered it to) the Ægyptians in this and all other Mathematicall Sciences, who afterwards became very eminent therein; ſo that *Moſes* is ſaid to be trained up in that kind of Learning. From the Babylonians and Ægyptians (in proceſſe of time) it paſſed to the Greeks, as *Herodotus* teſtifies, and with him *Theon Alexandrinus in Aratum*, ἐδέξαντο δὲ ἀυτὰ ἕλληνες παρὰ Αἰγυπτίων χαὶ χαλδαίων: the ſame doth *Seneca* averre in his *Nat. Quæſt. Lib. 7. cap. 3.* Some ſay, that *Thales Mileſius* brought it firſt from thence to Greece, but I aſſure my ſelf, that it was there before his time, witneſſe *Homer*, who deſcribes *Achilles* to be a Mathematician, elſe *Vulcan* laboured in vain, who made a Buckler for him, with the engravery of the Mundane Syſteme. *Iliad. lib. 18.* neer the end.

Ἐν μὲν γαῖαν ἔτευξ, ἐν δὲ ὀυρανὸν ἐν δὲ θάλασσαν
Ἠ᾽ ἐλεὸν τ᾽ ἀκαμαντα, βελήνην τὲ πληθοῦσαν
Ἐν δὲ τὰ τείρεα πάντα τὰ τ᾽ ὀυρανὸς ἐστεφανῶται, &c.

The Earth and Sea he firſt did place,
And next to that the Heavens maze;
Herein he fixt th' unwearied Sun,
And after him the full of th' Moon:
Laſtly, the Stars he did inſert,
Wherewith the Heavens were begirt.

After theſe we have recorded *Meton* the *Athenian*, and *Euctemon* to have obſerved the *Æſtive Solſtice:* next *Ariſtotle* that gallant man (who, me thinks, may challeng followers of his practiſe in this as well as his precepts in the reſt) who teſtifies of himſelf; *Lib. 2. cap. 11. de Cœlo,* that he ſaw *Mars* Eclipſed by the Moon. Not long after, *Timochares* and *Ariſtarchus Samius* about 300 yeares before our Saviour Jeſus Chriſt, were famous; for the one obſerved the applications of the Moon to the Fixed Stars, this other the Summer Solſtice, and publiſht a Book entituled *De Solis, Lunæ & Terræ magnitudinibus*, which hath periſhed by the injury of times: hitherto Aſtronomie was but in its infancy untill *Dionyſius Eratoſthenes* and *Archimedes* 200 yeares before our Redemption, afforded their aſſiſtance, who were very induſtrious in the obſervation of the Tropicks. 160 yeares *ante Chriſtum* flouriſhed *Hipparchus, Rhodius*, who was a great Pillar of this Science, in that he attempted more laborious and Atlantick atchievements then any that did preceed, hence that of *Plinie Hipparchus conſiliorum naturæ particeps*, and *Ptolomie* his ἄνδρα φιλόπονον καὶ φιλαληθῆ. After his time Hiſtory is ſilent of any notable herein, unleſſe it were the Eaſtern *Magi*, who came to worſhip by the help of that miraculous *Cynoſure*, the moſt glorious Light that ever appeared to poore mortals: untill about the 90 year *poſt Chriſtum*, when *Agrippa* and *Menalaus* a Roman, who were contemporary, and are ſharers in Honour, the firſt, for obſervation of that ☌ of the Moon with the *Pleiades*, the other for many Aſtronomicall experiments canonized in *Ptolomie*. Preſently after aroſe *Theon Alexandrinus*, who obſerved the Motions of the Planets, and is alledged by *Claudius Ptolomeus* the Ægyptian, and Maſter of Aſtronomy among the Greeks, who preſently ſucceeded, and by his wonderfull pains under *Hadrian*, and *M. Aurelius Antonius*, Emperours, *Ab anno Chriſti* 125, *ad annum* 141, together certainly with immenſe charges, collected and compared Obſervations, whereby he made Tables of the Motion of all the Planets, &c. we may give him this Character. *Vir equidem tam ſtupendi ingenii, ut Aſtronomorum Corypheus quotquot huc uſque fuerunt meritò appellaretur.* By this time Aſtronomy, had got ſo much perfection and maturity, that one would have thought nothing more could be added to it; μετὰ τὴν μεγάλην σωντάξιν; ſo that it kept this ſtay, untill more time and obſervation had diſcovered the truth and worth of this Science more amply to all Nations, eſpecially after that, *Alexandria* a famous nurſery of *Urania* was taken by the Mahumetan faction, which cauſed Learning together with its Profeſſours, to ſpread abroad as far as *Arabia* and *Syria*, wherein *Albategnius* was founded about *anno Chriſti* 880, whoſe Obſervations about the Luminaries obliquity of the Zodiack, and of the Fixed Stars are of very great moment, and are at this preſent ſure proof of his admirable skill. From *Africa* it was tranſported to *Spain*, where one *Arzahell* a Spaniard, about *anno Chriſti* 1080, was much eſteemed, becauſe he ſet forth publickly the obliquity of the Zodiaque obſerved by himſelf. About the ſame time, the Perſians by their great endeavours made Aſtronomicall Tables, and the Emperour fixed the beginning of the year at the Vernall Equinox, which is yet ſtrictly obſerved. By this time, the Ptolemaick Tables did wonderfully, *& toto quidem Cœlo errare*; from the truth of certain Obſervations, ſo that for the ſupport and advancement of her ſelf, *Urania* ſtirr'd up *Alphonſus* (about 1252 *Chriſti*) King of *Spain*, who invited an aſſembly of the moſt famous Aſtronomers, that then were, conſiſting of Jews, Arabians and Spaniards, and by their aid, and the expence of above 400000 Ducats, compoſed new Tables, called *Tabulæ Alphonſinæ*, which may juſtly appropriate to their Authour that of *Horace*.

Exegi monumentum ære perennis,
Regaliquè ſitu Pyramidum altiùs.

I've built him ſuch a monument of fame,
No braſſe, nor Pyramide, can yield the ſame.

Theſe Tables divers Aſtronomers, *Blanchinus Anno* 1458, *Gauricus* 1524, *Hamelius* 1545, *Prugnerus* 1553, augmented and put forth anew. Again, in the ſame year 1553, *Purbachius* put forth Tables of Eclipſes, grounded upon his own obſervations, after whom *Regiomontanus*, his Scholer, comparing the Ptolemaick and Alphonſine Tables together, and correcting them by his own Obſervations, put forth an *Ephemerides*, beginning 1476, until 1506, whoſe example *Joh. Stofler* followed, and from the year 1507, to 1556, and *Leovitius* continued, writing *Ephemerides* from 1556 to 1606, yet notwithſtanding all theſe able men, and their great induſtry, theſe Tables were but *unius ætatis*, and of a ſhort continuance, being grounded upon a falſe *Hypotheſis*, miſtaking their Center, for *ex falſis premiſſis plerumque ſequitur falſum*, ſo that untill *Copernicus* his time, about 1500: Aſtronomy attained to no great virility, who poizing his one 30 years Obſervations with others, at laſt found out, and diſcovered the true & genuine Syſteme of the World, and compoſed new Tables, which *Rheticus* his Scholler reformed. By theſe *Reinhold* made the Prutenick, and *Maginus* publiſht his, according to theſe Tables the ſame *Maginus* and *Scala* compoſed *Ephemerides*, *ab* 1581 *ad* 1630. *Stadius* alſo *ab* 1554 *ad* 1606. *Origanus ab* 1595 *ad* 1654. At this time the Favourites of *Urania* began to multiply, eſpecially, when ſhe had procured ſo honorable a ſervant as the noble *Tycho Brahe*, who by his wonderful diligence and utmoſt exactneſſe in the ἀυτοφία of the Stars, found that in the year 1563, that the great Conjunction of *Saturn* and *Jupiter* in *Cancer*, was not conformable to the Alphonſine, nor indeed the Copernican accompts, and by the apparition of that new Star in *Caſſiopeies* Chair *A. C.* 1572, rectified the places of the Stars, which by the Copernican Tables did deviate a whole degree and more; he ſpent above 200 Attick Talents in the building of his *Arx Uraniburgica*, and framing of exquiſite and large Inſtruments for the Reſtauration of Aſtronomy, as you may ſee in his *Aſtronomia Mechanica*, and although he hath incomparably excell'd all that ever was, or will be expected in his admirable obſervations, yet it muſt be confeſſed he framed from thence but a poor *Hypotheſis*, being a mixture of the Ptolemaick with the Copernican, as *Bullialdus* doth fully demonſtrate in his *Syſtema Phylolaicum*, and learnedly confute the ſame, ſo that ſtill *ultima manus* was wanting to perfect thorowly this goodly Science: what he ſaid of the Roman Nation, *non erat unius Romanam condere gentem*, we may ſafely attribute to this Art, that not one nor 100 ages and men could wholly compleat it, for *Tycho* died *Anno C.* 1601. 14 *November*, having left this name, that he was the Phœnix of Aſtronomy; and two of his Coadjutors *Longomontanus*, and the worthy *Kepler*, the latter whereof, I think was the moſt ſubtile Mathematician that ever was, his books which he hath wrote of divers ſubjects will eaſily teſtifie the ſame: he it was that invented the Motions of the Planets to be performed in an *Ellipſis*, which the painfull and learned *Bullialdus* hath curiouſly demonſtrated. But here *Pedem figo*, I mean my Pen, leſt of a Preface I ſhould make a Treatiſe, and give my Reader ſome inſtructions concerning the preſent Work, and the occaſion thereof.

Having for my own delight and recreation ſpent ſundry yeares in the ſtudy of the Mathematiques, and particularly in the contemplation of this moſt famous Science of Aſtronomy, and having not yet publiſhed any of my labours, (though I muſt confeſſe I have been often urged by ſome of my intimate friends and acquaintance, who deſire the reſtauration of theſe Sciences) I have now adventured, in my tender yeares, (leſt I ſhould burne like the ſubterranean oli-lean Lamps, and give no light abroad;) to communicate the following Tract to the view of the World, and eſpecially to them who beſt know and diſcerne the excellency, true worth, and incredible profit of this Art. Had the Learned of this Nation publiſhed any thing of this nature in the Engliſh tongue I had been ſilent, but to the day of the writing hereof, they have not, and its my hap indeed to appear firſt upon the Engliſh

Theatre, hoping that others, (who are more able then my ſelfe) will ſecond theſe my weak endeavours, that ſo this moſt noble Art, may become more known and famous in our Engliſh Nation.

But the path being ſlippery where none have trod before me, thou may'ſt perhaps meet with ſome præcipice, but I have thoroughout (as much as in me lieth) laboured to diſplace, and remove out of the way all ſuch difficulties, and hindrances, as might any way interpoſe themſelves, to hinder thee from enjoying a full and perfect knowledge, and fruition of theſe my painfull labours.

Neverthleſſe, I am not ignorant, how that never any man living in his writing could pleaſe the fancy of all men, neither doe I expect to be the firſt; to pleaſe the envious I cannot, for they are reſolute; to content the ſcornfull, I will not attempt it; to flatter the haughty, were much folly; to diſſwade the captious, were needleſſe; and to perſwade the Courteous, is unneceſſary. Let every one doe as his genius doth beſt diſpoſe him; take where he pleaſeth, reade what he liketh, and leave what he liketh not. For my own part, I have with much diligence and induſtry waded thorough many ænigmaticall difficulties, and have removed and drawn back the Curtaine of darkneſſe from off our Engliſh Horizon, having un-vailed the beauty and marveilous compoſure of the Fabrique and Machination of the Viſible World, and as it were diſplay'd, and ſet forth the ſplendour and admired Harmony of the parts thereof.

And, although, it may ſeem ſtrange (at firſt view) amongſt them that are not much verſed in Aſtronomy, that according to our Hypotheſis, the Sun (who is the Fountain of Light) ſhould reſt in the Center of the World, having onely a motion about his own Center, and that the Earth (which of the moſt was there imagined to be ſcituate at quiet) ſhould be no other then a meer Star, and have a Circular Motion in the middle of thoſe Orbs we call Cœleſtiall, yet I doubt not (though with ſome it may peradventure ſeem a Paradox) but that the judicious will grant it for no leſſe then a reall verity. It's no new opinion, but a hidden truth, *terram moveri, Solem & Cœlum ſtare.* Many may think it a meer fiction we go about to eſtabliſh, but if ſuch there be, let them patiently read, and I then queſtion not, but when they once come to ſee, how the apparent Motions of all the Planets in their Orbs depends ſolely upon the annuall Motion of the Earth, and withall conſider their various and different poſitions in reſpect of the Earth, and their vicinity thereto at one time, and vaſt remotion at another (as they may perceive by my reall Demonſtrations) I then queſtion not, but they will be of my ſide; and will then underſtand their former errour, and may diſcern the fallacy of the Ptolemaick Syſteme, and the abſurd ſuppoſitions of his followers, who not content with thoſe ſimple Motions Nature hath aſſign'd them, but fondly have deviſed a multiplicity of ſuch Orbs and Circles as are not in Nature, that by help of them they might ſalve the *Phænomena.* But *Ariſtarchus Samius* (though the firſt Mathematician we read of in *Græcia*) no ſooner beholding the Heavens and the Earth, but he conceived the true type thereof, and drew the reall image of the Viſible World, with whom, *Pythagoras* and many other in thoſe priſtine times agreed, and, notwithſtanding, this truth was much eclipſed by *Ariſtotle* and his favourites, yet the vail is now quite removed, and the truth clearly appears in its own colours, in deſpight of *Fromondus, Morinus, Alexander Roſſe,* or any, or all the greateſt opponents this day living. That this Copernican Syſteme is proved by apodicticall Mediums, I am certain, ſee *Bullialdus* his *Syſtema Phylolaicum*, *&* *Galilei Syſtema Coſmicum.* I know nothing of worth oppoſeth it; No? ſaith my adverſary, what think you of the Scripture? why, I anſwer, that whatſoever is there ſpoken of the Earths Reſt, or the Suns Motion. *Pſal. 92. Pſal. 103. Ecleſiaſt. 1. Pſal. 18. Iſa. 38. Ecleſ. 48, &c.* is to be underſtood: *Secundnm noſtram apprehenſionem, & communem loquendi modum, non ſecundum rerum naturam*, as the Philoſophers ſay; according to our apprehenſion and vulgar manner of ſpeaking, and not according to the nature of the things; as that of *Geneſis 1. Let there be two great Lights, the Sun and Moon*; doubtleſſe, the Moon hath no innate Light, neither any competent proportion to the other Stars, ſo likewiſe underſtand of the ends and foundations of the Earth; the reaſon why the Scripture doth ſo ſpeak: *Ego Dominus Deus docens utilia, Iſa. 48:* the gloſſe hath it, *non ſubtilia*; ſo *Paul* to the *Corinth. Non enim judicavi me ſcire aliquod inter vos, niſi Jeſum Christum & hunc crucifixum*, ſo much as will ſave our bodies and ſouls into eternall life, not Philoſophy and needleſſe queſtions, which do onely tickle the ear, as *utrum eădem ſit natura Cœli & Elementorum? &c.* and the like diſputable queſtions, in which if we will be ſatisfied, we muſt ſtudy Philoſophy, and not make the holy Scripture the reconciler of thoſe doubts, which are infinite. But if any be ſo refractory, he cannot aſſent to the Phyſicall truth, let him conſtrue it as a meer *Hypotheſis*, and I will return to my task in hand, the Book enſuing, which is divided into four parts. The firſt, conteins the Doctrine of Trignonometry, after the moſt eaſie way by Logarithms; The ſecond, ſhews their farther uſe in Aſtronomy, wherein is laid down many Propoſitions of extraordinary uſe, few of them being yet treated of in the Engliſh tongue. The third, conteins [a New, acurate, facile and brief Theory of the Planets] newly deviſed by the Authour, wherein is plainly and ſuccinctly delivered the Fundamentall grounds of this Doctrine of Aſtronomy, and how to calculate the Motions of all the Planets Trigonometrically, wherein I much diſcent from all other Authours that have treated hereof in other Languages, and have delivered the ſame more methodically for practiſe, then any hath done before me; having for the avoiding of Multiplication and Diviſion, made uſe of the Table of artificiall Sines and Tangents, whereby the Operation may be performed with far more caſe and expedition: whereunto is annexed divers Propoſitions Aſtronomicall, to finde the Magnitude, Proportion, Diameters, Diſtances, Intervals of the Planets and Stars, and their Proportions one to another, mutually by the Doctrine of Triangles, and have alſo ſhewed in the ſecond how to finde the Parallax of the Sun, Moon, and other Planets with marveilous ſpeed and dexterity.

In the fourth Book, I have ſhew'd more artificially, how to calculate the true Motions of the Earth, Planets and fixed Stars, for any time paſt or to come, by new Tables, calculated according to the Doctrine of the third Book, whereby there true places from the Sun may exactly be obtein'd, by help of the Tables of Æquation, but the Parallax of the Earths Orbe, is to be acquired Trigonometrically, and is as eaſily perform'd by the *Canon* of artificiall *Sines* and *Tangents*; as it could have been, ſhould I have taken the paines to compute particular Tables to attaine it.

In every part whereof, I have uſed as much plainneſſe and brevity as could be poſſible, inſomuch, that men of meaneſt apprehenſions may with a little care and practiſe, in ſhort time, come to the perfect underſtanding thereof.

In which Worke I have principally made uſe of the late Obſervations of Noble *Tycho Brahe*, who by help of his large and curious Inſtruments, did lay ſo good and firm a plat-form and ground worke for the reſtauration of of Aſtronomy, that *Kepler* and ſome others ſince his death, have very much revived the Art, ſo that by their helps, we now know the exact quantity of all their Orbes and Sphæres, and their true proportions one to another, wherby we are enabled to Calculate the exact Courſe and Motions of either Sun, Moon, or other Plauets *ad punctum*, which before could not be attained to by ſome degrees.

Laſtly, I deſire the judicious Reader, if he chance to meet with any *Errata's*, (as ſome may happen in a Work of this nature) that he would courteouſly amend them, and not with Cavillation ungratefully requite my painfull Labours. Happily, if this finde acceptance, it will encourage me ſhortly to publiſh ſome other thing, which perhaps may give thee much ſatisfaction, and be commodious to my Countreymen of *England: Valete.*

Yours, and *Urania's* Servant,

Vincent Wing.

To his Ingenious Friend
Mr. *VINCENT WING*,

VINCENT, thy Book ſo out-ſoares ev'ry thing
Formerly writ, that ſure each leaf 's a WING
Of high-flown *Fame*, which nimbly through the *Skie*;
Faming thy praiſes, 'bout the *World* will flie:
There's not a *Signe*, a *Planet*, nor a *Star*,
But thou with them as well acquainted are,
And can'ſt as eas'ly call them by their names,
As I our *Tom*, our *Will*, our *Jack*, our *James*.
At firſt peruſall of thy *Book*, I ſee
Such wry-mouth'd *words*, ſeem'd *Heathen Greek* to mee,
Quotus, *Parallax*, I threw't by for fear
I might have made old *Belzebub* appear,
But recollecting of my *ſenſes*, I
Perceiv'd them phraſes in *Aſtronomie*.
Sure thou do'ſt guide the *motion* of the *Sphears*,
The *Sun*, the *Moon*; Nay, it plainly appears,
That they nor *riſe*, nor *ſet*, nor *change*, but when
Thou do'ſt direct with thy *Prophetick* Pen.
It is obſerv'd, the *Waters* here below,
When thou comand'ſt ſhalt *ebb*, comand'ſt ſhal *flow*,
To get their *Harveſt*; divers would deſpair
Should not thy *Almanack* ſay t'would be *fair*;
Poor *Husbandmen* unto it trembling goes,
To ſee how many *Froſts*, how many *Snows*,
And they according as *WING* ſhall deſcry,
With fodder ſtore themſelves accordingly:
In'it thou tel'ſt us that in fifty two,
Wee'ſt have a ſtrange *Eclipſe*, why could'ſt not thou
As well fore-told us of theſe *Times?* and ſo
They might have been prevented long ago,
Thou'rt cenſur'd for't, but ſure they do thee wrong,
In ſaying thou waſt brib'd to hold thy tongue.
Prethee hence-forth if *Wars* this *Land* divide,
Dear friend direct me, to be of th' right ſide,
For which (but that my unpoliſht Verſes will
Rather detract, then add unto thy skill)
I ſhould extreamly pride my ſelf to pay
A Paper Off'ring to thee ev'ry *day*.

Matth. Dale.

IN
HARMONICON COELESTE,
V. Wing.

LEt *Poets* tell us after this the Skies
Have feaſted *Heroes* with their Deities,
While thy great *Genius* may not only come
Into the Cellary, or Dining Room,
But ſearch thoſe Cloſets, whoſe Retirements are
Coverts, for all that's ſecret, all that's Rare.
Let the *Arabians*, whoſe Philoſophy
Hath chriſten'd all the Pariſh of the Skie,
For Names, and Styles of Conſtellations look
In Heavens Muſter-Roll, as their Church-Book:
While thy new Scheams their older Tables can
Confute as th' Bible doth their *Alcoran*.
Whil'ſt thou do'ſt from new principles Divine,
Each ſeverall Planets maze through every Signe:
May we believe each Planet would be led
By thee, and by thy more then *Cretan* thred
Shape their own paths, whilſt no obliquity
Can hide, or counterchange its ſteps from thee.
We wiſh the Brags of Ancient Arts were true,
That they might adde more Luſtre to thy new,
By being excell'd, or that it had not long
Been prov'd untrue that a *Theſalian* ſong
Can by ſtrong charms unſtar the *Hemiſphear*:
The ſtartled world to ſilence that, would hear
How to thy Numbers each intelligence
To ſtudy their own Orb deſcended thence;
And how the unbodied movers did conſpire
To take from thee, the art of their own Quire.
From thy own Pen, all that Antiquity
Accounted Legends, is mad Hiſtory;
As that *Endymion* from a Mountains height
Embrac'd the watery Goddeſſe of the night;
We plot not now to finde the *Metaphor*,
Or miſ-believe the fact, but ſcorn it for
A trifle: ſince one reach of thine from thence,
Graſpes the *Firſt movers vaſt Circumference*.

Let *Archimedes* ask no more of *Jove*
A place to ſet his Vice, ſince thou canſt move
The Earth without it, let him now diſ-uſe
Thoſe by his practiſe ſtill unfaſten'd ſcrews,
And learn from thee that to move earth and men,
There needed but one tool, and that's a Pen.
Now in all theſe, thy Work not mine is done,
I faintly ſhrink from vvhat I had begun,
And finde the feet of Verſe too ſlovv to tread
Thoſe meaſures thou, and ſvvifteſt Orbs do lead:
Yet ſhalt thou not remain unprais'd by me
Some conſtellations ſhall thy Garland be
To ſtud thy Temple vvith more Stars then thoſe
That thickeſt, *Ariadnes* Crovvn encloſe

Tho. Pockley. T.C.

IN LAUDEM OPERIS ET AUTHORIS:

TO build a *Palace* rareſt Stones are brought
From forreign places, and chiefe *Maſons* ſought:
For *Princely Ships* beſt *Timber* is collected,
To frame the ſame choice *Shipwrights* are ſelected.
The learn'd *Phyſicians*, ſuch as were of old,
Hippocrates and *Galen* lie and mold;
Now *Paracelſus* clayms the curing part,
And moſt men practiſe the *Spagyrick Art.*
Great *Ptolomy* Aſtronomie's chiefe Prince
Left the *Earth fixed, and not moving:* Since
Copernicus, by a ſuppoſed skill,
Findes the *Earth moving*, and the *Sun ſtand ſtill:*
And many Learned Tracts are daily pen'd,
One to oppoſe, another to defend;
Thus when we *Steel* and *Flint* together ſmite.
We kindle *ſparks*, and thoſe *ſparks* give us light.
Alphonſus ſpent a maſſe of gold to finde
The heavenly Motions: *Tycho* not behinde
In that great Work, made Inſtruments ſo large
And coſtly, that they did ſurmount his charge.
Kepler profound did perfect that rare Frame,
And left behinde an ever-living Fame.

Th' *Alphonſine* Tables ſeldome now are thought
Upon; the *Prutenicks* but rarely bought;
We'have try'd the *Daniſh*, The *Richelian*
Lansberg's and *Argols*; the *Copernican*,
Eichſtadius and the learned *Bullialdus*,
And many others, but all ſomtimes fail'd us,

ciphers it Comme
xe Bolg

And by their various workings almoſt dul'd us.
And in concluſion we doe finde them differ
In many matters, all not worth a *Cipher*:
For *Tycho Brahe Phœnix of the Art*
Lay'd the foundation; They did act but part,
And here and there did alter, add, and frame,
What they deficient thought, to get a name,
W'have markt fore ages, and this age too, when
Books drop from every common undipt pen,
And thoſe too patcht, imperfect, blinde and lame,
And all ſtill write, but diverſly, the ſame:
Tycho was *Phœnix Vincens*, here's a *WING*
Of that rare *Bird*, which faithfully doth bring
Us welcome news from Him, and from the reſt
Or He, or none, hath found the *Phœnix Neſt*,
And like it is to be proclaim'd by Fame,
HARMONICON COELESTE call its name.
Th' *Hypotheſis* is firm, not built on Sand,
In praiſe of which and whom, I put my hand.
For I foreſee, and verily believe,
As long as there is time, *This Work will live*.

John Booker.

IN
HARMONICON COELESTE,
Vincent Wing.

THe *Eagls Wing* but to the *Skie* can ſoar,
And this our *Wing* hath reach'd as well as he;
Nay ! this our *Wing* is *Vincent*, and far more,
Attained hath the *Fixt Stars* in degree:

And round about the *Heav'ns* rides in a day,
With *Phaeton*, but hath far better skill:
The ſnorting *Pyroeis*, and *Ætheus* way,
Both *Phelegon* and *Eous* to guide at will.

His nimble *Wings* ne ſinge, nor doth he melt
With *Icarus*, ſuch boyes ſet all on fire;
This our *Wing Salamander*-like hath dealt,
And yet not ſcorcht, though climbe he doth far higher.

THEN:

COrripe lora manu, nec ſit mutabile pectus
In te, conſiliis utere tuque tuis.
Macte tua ſic Arte brevi facis iter ad aſtra
Uraniæ *pandis commodiuſq; vias.*

Tu *ſolem medio*, Tu *regia Sydera quinq;*
Tu *pingis* Phœben, *perge, & Amice vale.*

G. A.

To the Author, M^r. Vincent Wing.

THy Book needs not deſire a greater fame,
It's a ſufficient Title to'have *Wing's* name,
Let *Zoyle* alone, his envie's far below
That Art thou here unto the World doſt ſhow:
My name-ſake *Johnſon* with his ſacred laies,
Had he now liv'd, could not augment thy praiſe;
So neighbour *Wing* I'de have thy name to fly
Still upwards, towards the *Azure Canopie.*

Your loving friend

Edward Johnſon.

TO THE READER:

IN

Praiſe of the Art *and* Author.

SAcred *Urania* envites them to draw nigh,
And be partakers of her *Harmony*;
Whoſe *Wing'd* ambitions elevate their eyes,
To view the order of the Spangled Skies:
There they may ſee the Sun in th' Center, and
The other Planets (by the ſtrict command
Of their Creator) moving day and night
About the Sun, the Fountain of their Ligh:
There they may ſee the *Zodiaque* beautifi'd
With various Figures curiouſly contriv'd;
And all the heavenly Conſtellations ſtand
Perpetuall Centinels at *Jove's* command.
Reader, peruſe this Worke, where thou ſhalt ſee
Th' very *Elixir* of *ASTRONOMIE.*
First, there are perfect Rules reſolving all
Triangles, whether *Plain* or *Sphæricall*,
And then their application doth appear
In ſeverall Propoſitions of the *Sphær*:
Then there's a perfect *Theory*, whereby
You may (with ſpeed) by *Trigonometry*,
Compute the Planets *Longitudes*, and ſee
When *Sol* or *Luna* ſhall Eclipſed be:
Thank then my Friend, who out of love to us,
Hath, from the dead, raiſed *COPERNICUS.*

Fare ever well, ſo ever wiſhes he,
Who is more yours then he can ſeem to be:

William Leybourn.

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Courteous Reader,

IN a work of this nature it's impoſſible to eſcape ſome miſtakes : Quid enim eſt familiarius homini quàm hallucinari ac errare? *which mankind could never totally evade ſince the firſt lapſe of his great Grandfather* Adam. *This preſent Tract is lyable to the like inconvenience, and hath ſome few* Typographicall *errours : nevertheleſs (though the Author were far remote from the Preſs, yet) by the care and diligence of the Printer, there are not any conſiderable faults eſcaped, moſt of them being only literall, which I deſire thee candidly to correct in manner following.*

Pag.7.lin.16.r *collectorum.* p.18.l.32.for 6 51.51.51.r.6.15.15.51. & l.*ult*.r.Characteriſtique. p.30.l.6 r.whoſe complement O N. p.43.l.26.f.or r.of. & l.34.*dele* moſt. p.46.l.41.r.revolution. p.47.l.14.r.the Arches of the Æquinoctiall. p.49.l.1.r.Elliptique. p.50.l.7.f.HX r.XH. & l.19.r.Angle DHN 102 15 26. p.51.l.42.r.6′41″. p.52.l.27.r.PBQ.& l.43.r.ANM.& l.44 r.ONM. p.54.l.8.*dele* A.& l.19.r.$46^{d}12'4''$. p.55.l.4.r.DN4047. & l.44 f.14′ r.41′. p.56.l.26.r.$41^{d}52'42''$. l.*ult*.r.174d 54′6″. p.57.l 4.r.$174^{d}54'6''$. p.59.l.3.r.deſcending. p.61.l.1.r.therefore. p.63.l.34.r.towards the Perihelion. p.65.l 34.r.in ♂ 4916. p.68.l.4.f.Compl.r.Argument. & l.12.*dele* which is the difference. & l.13.r.this, at S *dele Comma.* p.72.l.11.r.$0^{d}1'21''$. & l.39.r.$52^{d}22'45''$. p.77.l.47.r.planes. p.82.l.18.r.$22^{d}40'55''$. p.83.l.31.r.$2^{s}12^{d}51'1''$. p.84.l.3.r.678512. & l.14.r.712450. p.85.l.15.r.following Book. p.87.l.6.r.38640. p.94 l.39.r.HI. p.95.l.18.r.centrall. p.96.l.29.r.angle HDS. p.96.r.DH 152040 & *ſub Rad*.r.6.073314; 5.181958; 1.255272. p.101.l.27.r.GL. p.112.l.35.r.days 8. p.127.l.12.r.10.19.30. & l.15.r.5^{d}De. & l.30.r.7,90966 p.134.l.15.r,*Lib.*3. & l.22.r.*Cap.*32. p.155 from *Anno* 1585 *Novemb.*$14^{d}18^{h}10'$ r.Obſervations of Mercury. & l.43.r. ♊ $23^{d}16'$.

In the Tables.

Pag.166.lin.10.col.2.r.9 9 30 16. p.167.l.35.c.4.r.101582. p.168.c.4.l.30.r.100186. p.169.c.6.l.18.r.38 43. p.170.c.3.l.8.r.9 10 14 55. & c.4.l.9.r.4 14 21 46. & c.2.againſt May r.4 21 10 2. & againſt Ho.27.r.14 49 24. p.172.c.3.l.10 r.4 19 30. p.173.c 7.l.10.r.3894. p.183.c.4.l.24.r.1628. p.187.c.3.l.24.r.8 2600. p.189.c.3.l 14.r.5 53 18. p.193.c.3.l.19 r.1 5 39. p.194.c.4.l.21.r.530778. & l.27.r.528274. & l.29.r.527425. & l.37.r.523967. & l.38.r.523530. & c.7.l.21.r.517337. p.201.l.42.*dele* though. & l.43.r.though for my part. p.203 againſt 3^{d} r.4 48 23. p.208.c.3.l.41.r.0 20 25 50. & c.7.l.19.r.13 55. & l.20.r.15 39. p.210.c.4.l.30.r.41364. & c.7.l.10.r.39906.

Page 192. The mean motion of ♃ in Moneths of the Common year is thus to be corrected.

	Com.Y Lon.♃ d ′ ″		Com.Ye Long. ♃ d ′ ″
For	0 00 0	*read*	00 00 00
	0 02 0		02 34 37
	0 04 0		04 54 17
	0 07 0		07 28 54
	0 09 0		09 58 32
	0 12 0		12 33 09
	0 15 0		15 02 42
	0 17 0		17 37 24
	0 20 0		20 12 02
	0 22 0		22 41 40
	0 25 0		25 16 17
	0 27 0		27 45 55

In the Diagrams there are ſome few Letters omitted by the *Cutter*, which by diligent reading may eaſily be inſerted; and ſome other ſmall faults thou maiſt meet with, but they are not worth the noting here.

HARMONICON COELESTE: OR, THE COELESTIAL HARMONIE OF THE VISIBLE WORLD.

The Firſt Book.

THE firſt Book containeth thoſe neceſſary and immediate Elements of TRIGONOMETRY abſtractly propounded, which as the foundation to the ſuper-ſtructure, are laid down in a due Method and compendious manner; And although, I confeſſe, they have been already learnedly and carefully handled by divers of my Countreymen; Maſter *Briggs*, Maſter *Gunter*, Maſter *Norwood*, Maſter *Gelibrand*, &c. Yet to ſupply the ſcarcity of thoſe Books, and to furniſh my Reader with all expedients for the due underſtanding and practiſing of the intended matter, I have taken the paines to extract the moſt ready and eaſie Reſolutions of their Propoſitions, having ſuccinctly, by the new way of Art in Species, demonſtrated their effects, according to that Doctrine delivered to us by the Right Honourable Lord *John Nepeir*, Baron of *Marchiſton*, in S. and with him, Mr. *Norwood*, eſpecially following Dr. SCARBOROUGH, that rare Analyſt, and much deſerving in theſe Sciences, omitting their Illuſtration in Numbers, whereof you will finde variety of Examples in the ſubſequent Tracts. Laſtly, I have ſet down compendiouſly the uſe of the Tables of LOGARITHMES, and the work of Aſtronomicall Fractions.

Pt 1

CHAP. I.

1 IN the ſpeculation and practice of Mathematicks, the Triangle may challenge the ſuperiority of all Geometricall Figures, by whoſe aſſiſtance we can meaſure the Earth, compaſſe the Sea, ſurvey the Capacities, and know the Diſtances of thoſe glorious Creatures the Starres.

2 A Triangle is a Figure conſiſting of three angles and three ſides, whereof three things muſt be knowne, called *Διδόμενα* noted thus (⊢) to finde any of the other three, which we call *ζητούμενα* marked with (∷)

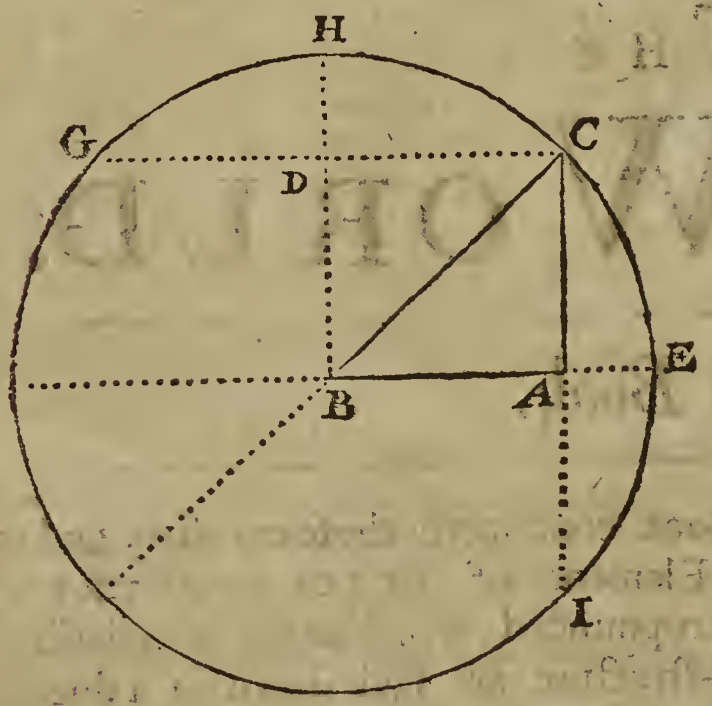
3 A Triangle upon a Plane is right lined, upon the Sphere, circular.

4 Againe, a Right lined Triangle, is either right angled, or oblique.

5 A Right angled, right lined Triangle, noted with A B C, we ſpeake of firſt, whoſe ſides then related to a Circle, are inſcribed totally, or partially.

6 Totally, if the ſide ſubtending the right Angle, be made the Radius of a Circle, then all the ſides may be called Sines (which is a term of Art borrowed from the Arabians) namely, B C ſubtending the Right angle, *Sinus totus*, the other two containing the Right angle *Sine & Co-ſine*, becauſe one is the Complement of the other to a Quadrant.

7 A Sine *in genere* is either Right or Verſed.



8 A Right Sine *in genere proximo* is alwayes halfe of the ſubtendant of the double Arke, which you ſee when the ſides are increaſed.

9 A Verſed Sine is perpendicular to the Right Sine from the term of the Arke, which of the Ancients is called *Sagitta.*

10 As in the Triangle B A C, B C is the Radius, or whole Sine, B A *Sinus ſimpliciter*, or firſt Sine, (according to former Writers) B A = D C is the Complement of the former, we call it the Coſine, and write it uſually thus (c s.) each of theſe Right Sines are halfe of the Chords of the double Arch, as is manifeſt by the Figure. The Verſed Sines are A E and F A, whereof we make no uſe in this Booke.

11 Here note, that any Sine (we mean the right Sine) is as well the Sine of the Complement of that Arch to a Semicircle. Thus C A is the Sine of the Arch F G H C Here inſtead of the Obtuſe angle, which alwayes exceeds 90 degrees, we take its Complement to a Semicircle, or 180 deg. which will want of 90. So inſtead of the Obtuſe angle C B F, we take the Acute angle C B E, hence our Canon of Sines never exceeds 90 deg.

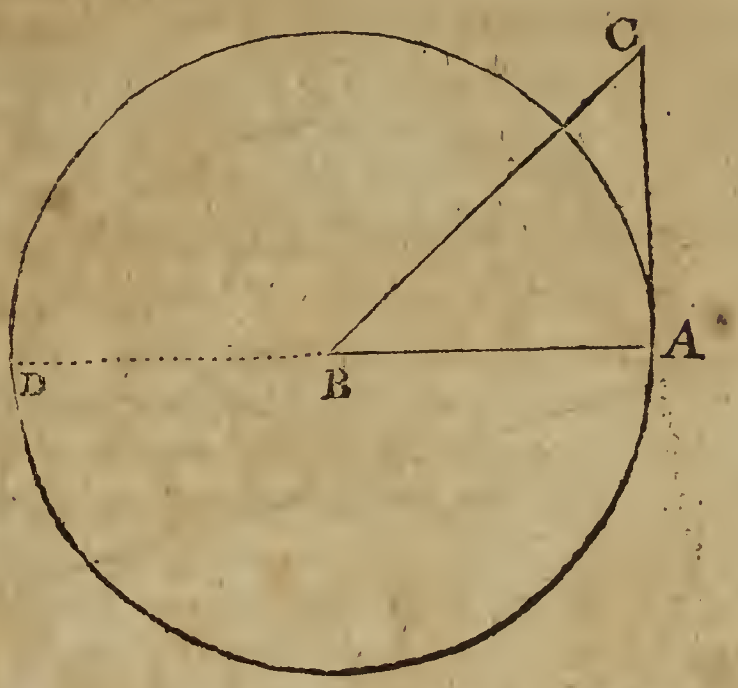
12 A Rectangle Triangle is ſaid to be partially inſcribed, when applyed to a Circle, one of the ſides containing the Right angle, is made the Radius, then ſhall the other ſide be a Tangent, becauſe it is a contingent, and the Hypothenuſe which ſubtends the Right angle ſhall be a Secant, for that it cutteth the Circumference, and is extended beyond the ſame.

13 A Tangent of an Arch or Angle then we may define to be a right line perpendicular to the Radius, touching the Circumference, which belongeth to the Complement of that Arch to a Semicircle, as well as to the Arch it ſelfe.

14 A Secant is a right line proceeding from the center of the Circle, and exten-

ded thorow the Circumference to the end of the Tangent, whereof we ſhall make little or no uſe.

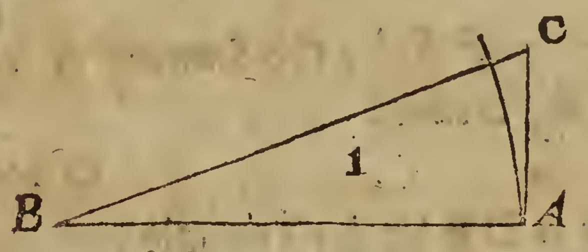
15 In the Diagram C A is a Tangent to the angle D B C, as well as to C B A, and likewiſe B C is a Secant to either.



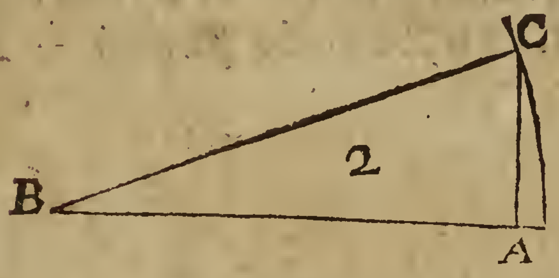
16 In all the premiſes take notice, that any ſide may be put as the Radius, and is the Reaſon of varying any proportion, that the Radius may be put in the firſt place to avoid Subſtraction, and taking off the Arithmeticall Complement.

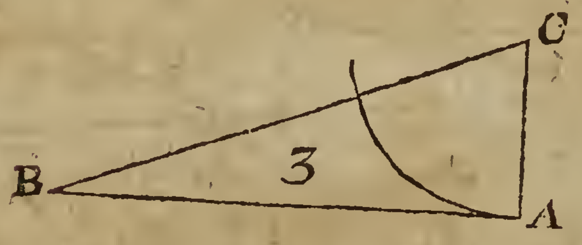
t C A, ſec. B C, (1) :: s. C A Rad. B C, (2) :: Rad. C A, ſec. B C, (3)
Againe, t. C A, Rad. B A, (1) :: s. C A, s. B A (2) :: Rad. C A, t. B A (3)

17 From hence it is manifeſt. That, As the Sine of an Angle, is to the Radius. So is the Radius, to the Co-ſecant of the ſaid Angle: and Tangent to the Secant; and by converſion.



18 It is evident too, As the Tangent of an Arch, is to the Radius; So is the Radius, to the Co-tangent; So the Sine, to the Co-ſine of the ſame Arch, *& contra.* Secondly, we may take this Corrolary. That, the Radius is a mean Proportionall betwixt the Sine and Co-ſecant of any Arch, and likewiſe betwixt the Tangent and Co-tangent.



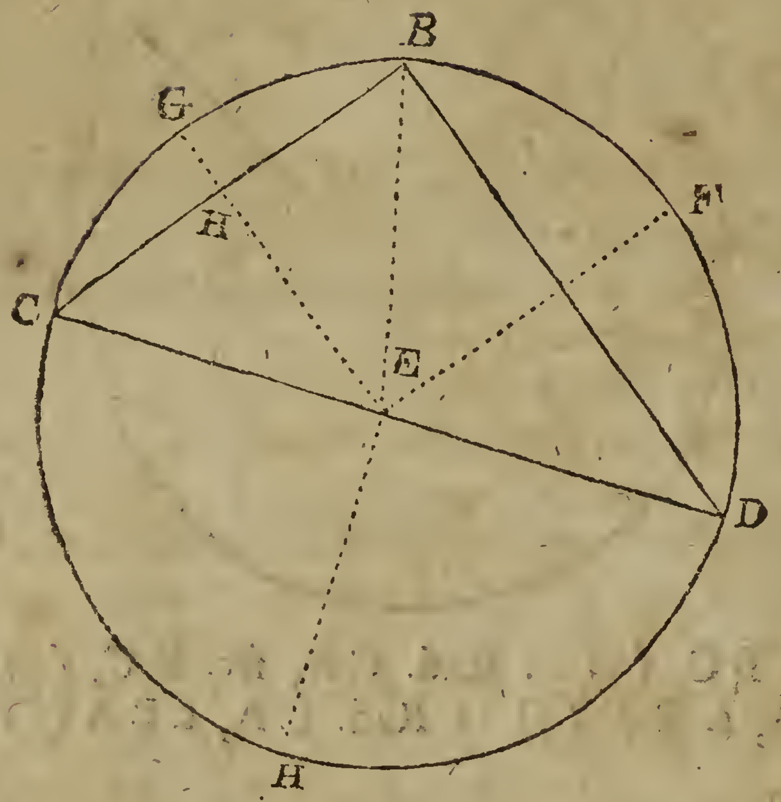


CHAP. II.

1 Hitherto of Rectangles, we proceed next to ſome affections peculiar to all plain Triangles *in genere*, but were intended chiefly for the ſolution of oblique angled *in ſpecie*: we will deliver them generally, and apply them in particular.

2 *In all plain Triangles, the ſides are proportionall to the Sines of their oppoſite angles*, & contra.

DEMONSTRATION.



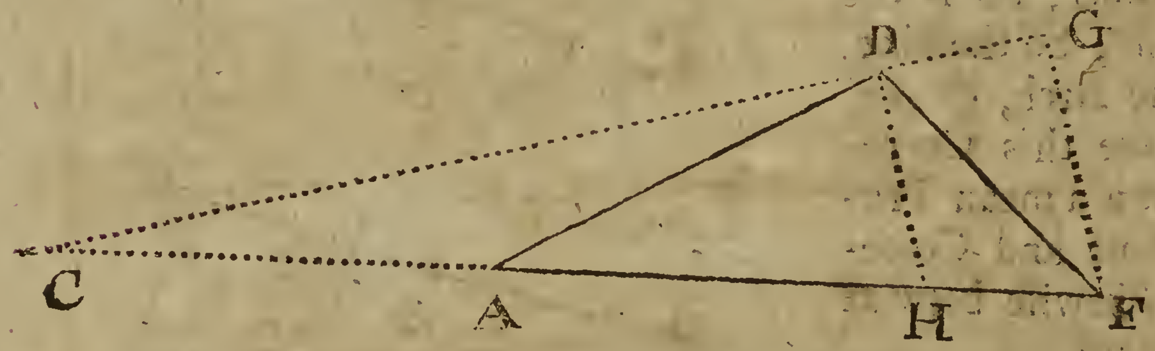
Let B C D, be the Triangle given, inſcribed in the Circle: from the Center E, let fall the Perpendiculars E H, E G, E F, which muſt biſect the Chords and their Arches (by the 6 L. 3 P. Elem.) Draw likewiſe B E, the Radius. Now becauſe B E G angle = B D C angle, (by 20 P. 3 Elem. &c.) therefore the halfe of the ſides ſhall be the Sines.

Therefore B C, C D : : H B, to E D. For as the whole, is to the whole, So the halfe, to the halfe.

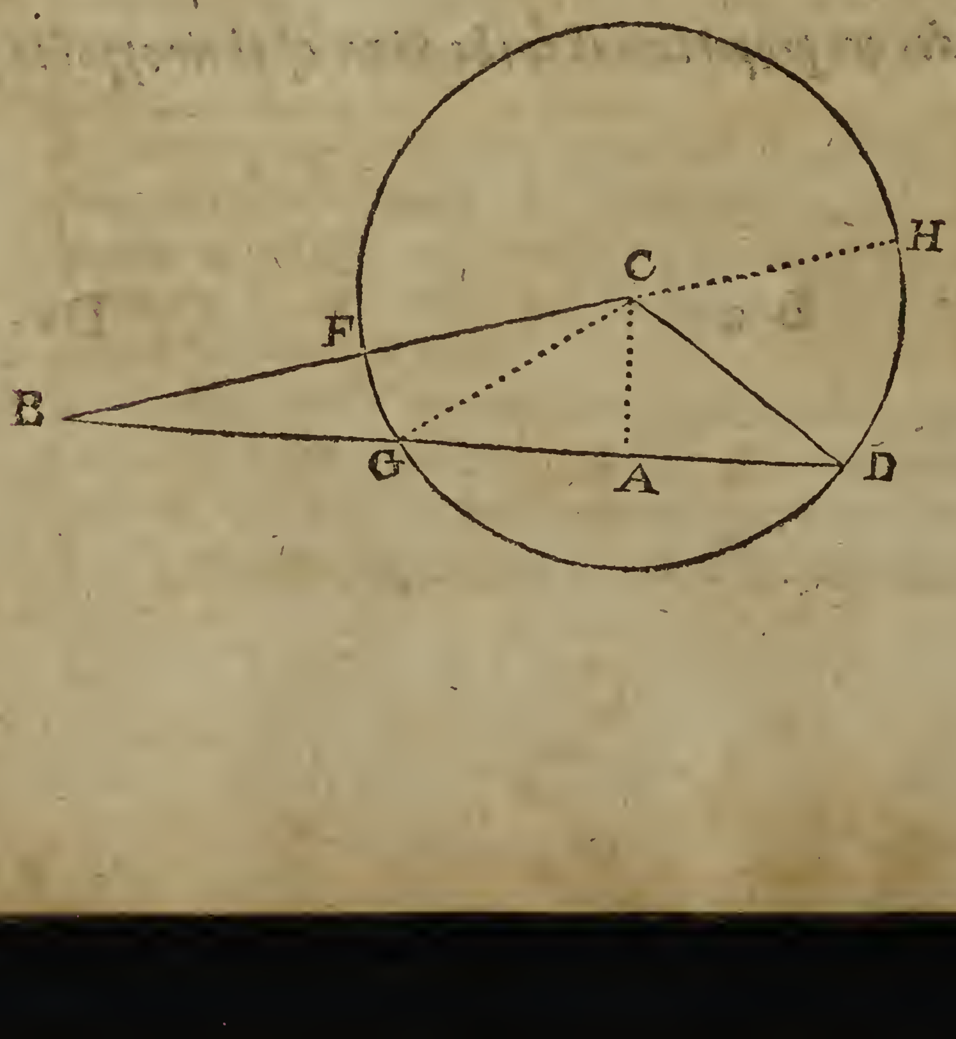
3 In all plain Triangles, *As the Summe of two of the Sides, is to the difference of the ſame Sides, So is the Tangent of halfe the Summe of the oppoſite angles, to the Tangent of halfe their difference.*

DEMONSTRATION.

Let A D E be the Triangle given: A D, A E, and A, knowne; extend A E, toward C, making C A = A D, and cutting off A H = A D. Produce C D, towards G, untill G E, be made parallel to D H; Hence it followes, that in the Triangle A D H, D = H, and alſo in the Triangle C A D, C = D, therefore, Angle C D H, = H + C, therefore Angle C D H, is a right angle, (by the 32 of the 1 Elem.) And becauſe G E, is parallel to D H, therefore Angle G E H = D H C, (by the 29 of the 1.) and G is a right angle, and likewiſe H D E = D E G, by the ſame. Moreover D H A angle = H D E angle + H E D angle, (by the 32 of the 1.) Put A D H, common to both, then it follows, that the angle A H D + angle A D H = A D E + A E D, therefore $AHD = \frac{AED + ADE}{2}$. Now therfore (by the 2. of the 6.) As C E, the ſumme of the ſides, to H E, difference: So C D, the tangent of half the ſumme of the oppoſite angles, to D G, which is the Tangent of half their difference.



4 *In any plain Triangle, As the Baſe is to the ſum of the ſides, So the difference of the ſides, to the difference of the ſegments of the Baſe.*



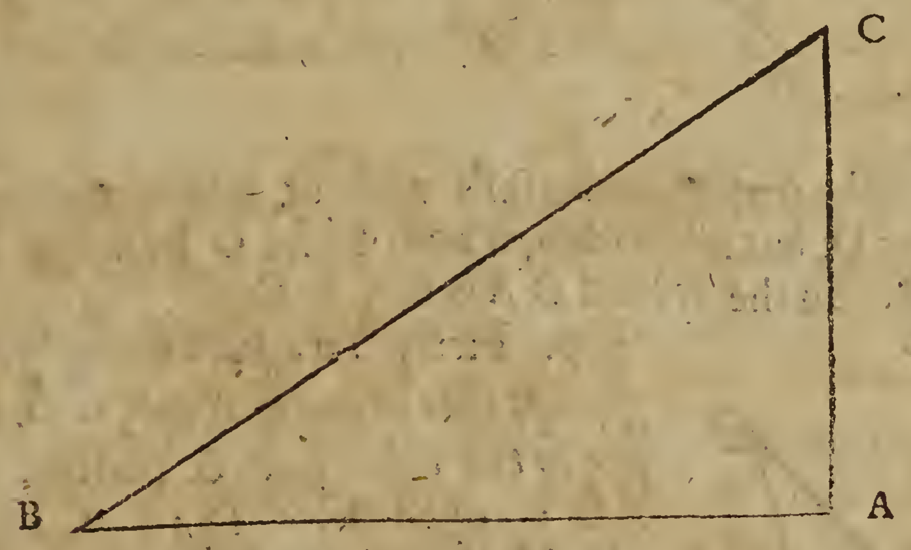
In this Triangle B C D, B D, is the Baſe, B H the ſumme of the ſides, the difference of the ſides B F, the difference of the ſegments of the Baſe B G, ſince C A the Perpendicular doth biſect G D.

G D. Now therefore by the 36 of the 3 of *Euclid* : B F × B H = B G × B D, therefore they are proportionall.

5 Theſe Foundations being thus laid, the πραγματεία, or buſineſs of plain Triangles is eaſily diſpatcht. The Rectangular I note with the letters A B C, A at the right angle, C at the Cathetus, B at the Baſis, So ſhall A B repreſent the Baſe, C A the Cathetus, B C the Hypothenuſe, by a neat Artifice. And that there be no confuſion in the workings, note the things given with this ſtroake (|) The Quæſita with three pricks thus in an Angle $\overset{\cdots}{>}$ In a- Side ſoe $\overset{\cdots}{\underset{\cdots}{-}}$

Orthogonii Diatypoſis:

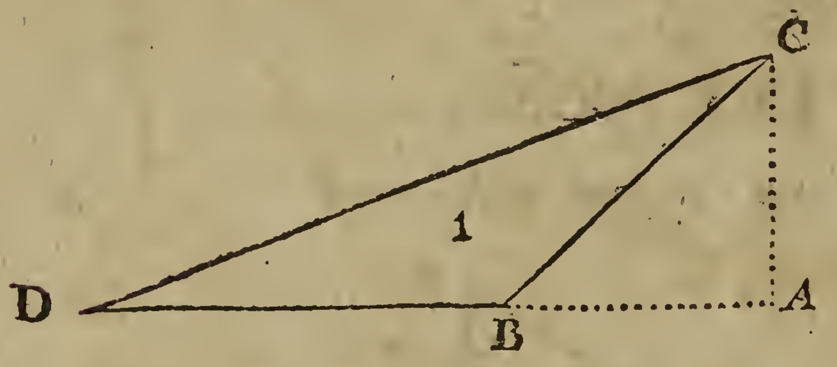
Wherein any of the Caſes is ſoon diſcovered.

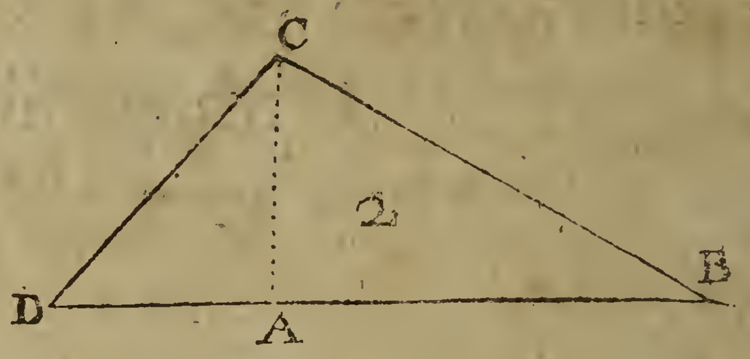


	Data.		Quæſita.		Analogia.
	Sides.	Ang.	Sides	ng.	: :
1	B A C A	Conterm. B C	C A B A	Oppoſit.	R. tB :: B A. C A R. tC :: C A. B A
2	B C B C	B C	C A B A	Oppoſit.	R. sB :: B C. C A R. sC :: B C. B A
3	B A C A	Oppoſit. C B	B C B C		sC. R :: B A. B C sB. R :: A C. B C
4	B A C A &			C B	C A. B A :: R. tC B A. C A :: R. tB
5	B A. B C B C. C A			Oppoſit. C B	B C. B A :: R. sC B C. C A :: R. sB
6	B A. C A		B C		Duplici operatiõne perficitur. 1 B A. C A :: R. tB 2 sB. R :: C A. BC Or in one by the Chiliads. $\frac{\text{Log. } BA \times 2 + \text{Log. } AC}{2}$ × 2 is equall to the log. of B C.
7	B A. B C or B C C A		C A. B A.		It may be performed by a double worke, but Mr. *Briggs* Cap. 16 & 17. Arith. Logarith. demonſtrates a more artificiall in one by the Chiliads. Log. B A + B C plus. Log. B C – B A divided by 2 = Log. of C A.

In oblique angled plain Triangles.

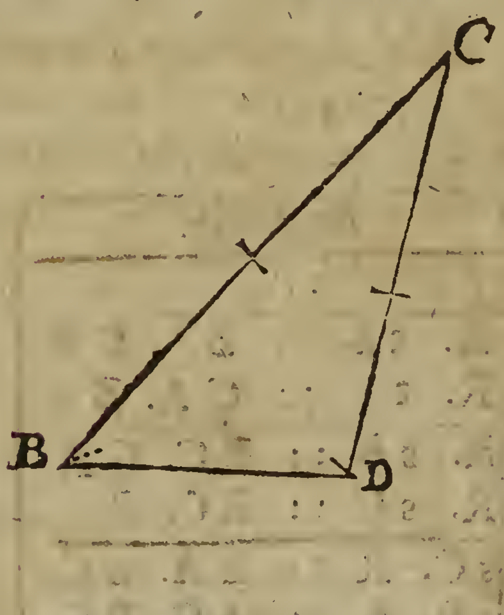
6 This Triangle I alwayes note with the letters B C D, and obſerve that if an Angle be given, together with one of the ſides containing it, let that Angle be noted with B, and the ſide with B C, ſo that a perpendicular let fall from C, ſhall diſtinguiſh the Baſes of the partiall Triangles.





In the firſt where the perpendicular falls without, which alwayes comes to paſſe when B is obtuſe, or D, but fals within, if both B and D be acute, ſo that in the firſt D A − B A = D B. In the ſecond D A + B A = D B.

7. Firſt, *Two ſides being given, and an Angle oppoſite to one of them, to find an angle oppoſite to the other ſide,* & contra.



B C : oppoſite. s. D : : C D : oppoſite. s. B.

8 Here note, that if the given angle be obtuſe, the oppoſite ſide to it will be greater then either of the reſt, and the other two angles ſhall be acute,

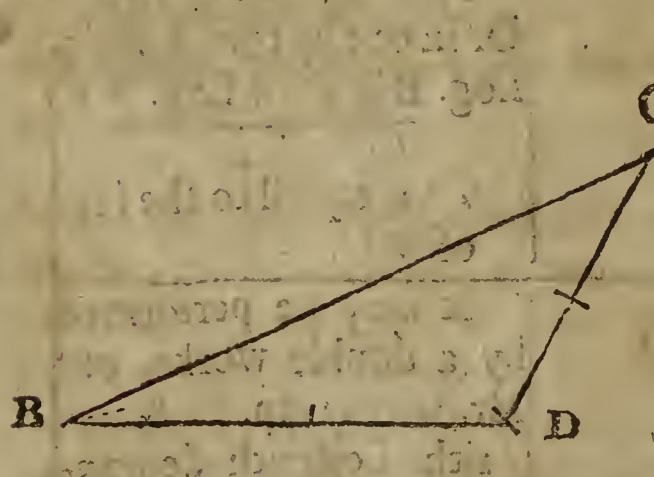
But if the given angle be acute, it will be doubtfull whether the angle oppoſed to the greater ſide be obtuſe or acute, yet will it be a true Sine of the fourth Proportionall, which may appertaine to the obtuſe, as well as the acute, as we made plain before.

9 That therefore we may know this angle, compare the greateſt ſide with the leaſt or the meane ſide: take the ſumme and difference, and if the half of theſe Logarithmes be equall to to the Logarithme of the third ſide remaining, the angle oppoſed to the greateſt ſide is a right angle, if greater, obtuſe, if leſſer, it ſhall be acute.

10 Secondly: *Having two Sides, and the Angle comprehended, to find either of the Angles remaining.*

$$BD+CD:BD-CD::t\frac{C+B}{2}:t\frac{X}{2}=\frac{1}{2}\text{ the diff.}$$

$$\text{Then }\frac{C+B}{2}\left\{\begin{array}{l}+\frac{X}{2}\\ -\frac{X}{2}\end{array}\right\}=\begin{array}{l}C\text{ the greater.}\\ B\text{ the leſſe.}\end{array}$$



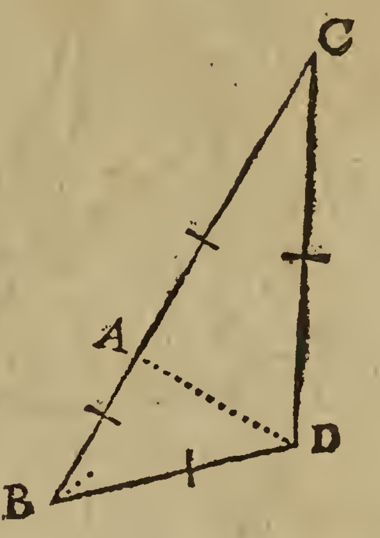
Expreſſed in words. As the ſumme of the ſides : to the difference of the ſame ſides : : So the t: of $\frac{1}{2}$ the Angles unknown, to t: of $\frac{1}{2}$ their difference.

Thirdly,

11 Thirdly, *Having the three Sides of an oblique Triangle, to find any angle.*

Two Workes required.

Analogia prima.



As the greateſt B C,
To the ſumme of the others ; C D + B D.
So is the difference of them, C D – B D.
To a number ; which being ſubſtracted from the whole Baſe, towards the beginning of the mean ſide C, the Perpendicular ſhall fall in the halfe of the Remainder, as at A.

Then ſecondly, B A D is right angled, wherein B D, and A B are given to find B.

As B D : R :: B A : cs B.

12 If you pleaſe you may perform it by Mr. *Briggs* his Rule, when one onely operation is required. (Arith. Log. Cap. 16.)

De dimidio colectorum Laterum ſigillatim latera ſubducantur; & ſumma Logarithmorum ſemiſſis ſummæ laterum, & differentiæ lateris Angulum quæſitum ſubtendentis, auferatur è ſummâ Logarithmorum reliquarum differentiarum, & duplicati Radii, ſemiſſis reliqui erit Logarithmus Tangentis ſemiſſis anguli quæſiti.

From the half of the collect ſides, ſubſtract each ſide ſeverally, then let the ſumme of the Logarithmes of half the ſumme of the ſides, and the difference of the ſide which ſubtends the required angle, be ſubſtracted out of the ſumme of the Logarithmes of the other differences, and the doubled Radius, the halfe of the Reſidue ſhall be the Logarithme of the Tangent of half the required angle.

CHAP. III.

1 A Sphæricall Triangle is a Figure deſcribed upon a Sphærical ſuperficies conſiſting of three Arkes of the greateſt Circles of the Sphære, every one being leſſe then a Semicircle.

2 The greateſt Circles of the Sphære are thoſe which have each the ſame common Center, that the Sphære hath, and divide one another, as well as the Sphære into two equall Parts or halves : hence.

3 Leſſer Circles are thoſe which have peculiar Centers, and divide the Sphære unequally. (Theodoſ. Prop. 6. and 11 lib. 1.)

4 A great Circle paſſing through the Poles of another great Circle, cut one another at right angles, *& contra* becauſe,

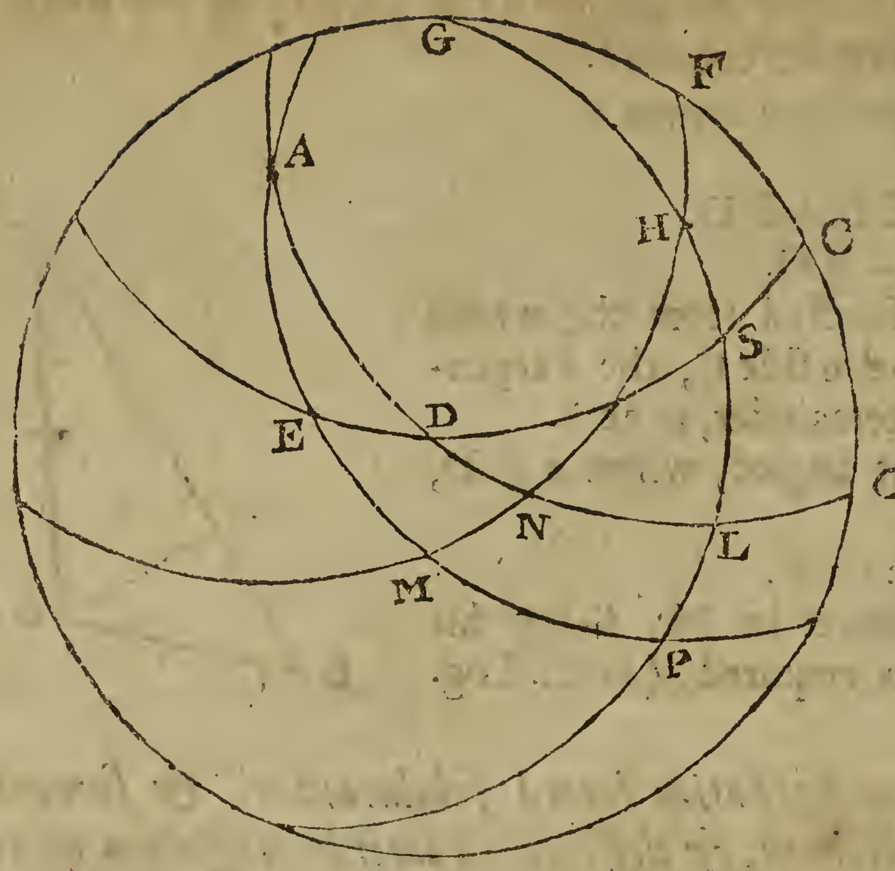
5 A Sphæricall angle is meaſured by the Arch of a great Circle, deſcribed from the angular point betwixt the ſides continued to Quadrants, *& contra.* Therefore,

6 The Sides of a Sphæricall Triangle may be turned into angles, *& contra*, the Complements of the greateſt ſide, or greateſt angle, to a Semicircle being taken in each converſion.

It will be neceſſary to demonſtrate this, which is of ſo frequent uſe in Trigonometry. Let G F O be the Æquinoctiall Colure, A D, the Æquinoctiall Arke, whoſe Pole is F. A E the Eclipticall Arch, the Pole H. E D the Horizontall Arch the Pole G. Now then at the Center A, and Quadrantall diſtance deſcribe M N, the meaſure of the Angle A. In like manner O C, the meaſure of D. PS. the meaſure of the Complement of E, in the ſame Sphæricall-Triangle A E D. Now then becauſe theſe Arkes M N, P L, O C, are by 90 deg. diſtant from A, E D, therefore being protracted they ſhall each go through two Poles of the ſaid Circles. Then F N = M H, from both which if you ſubſtract N H, will leave M N = H F, and by the ſame reaſon C O = G F, and PS = G H, &c.

7 The three ſides of any Sphæricall Triangle are leſſe then two Semicircles.

8 Every



8 Every Sphæricall Triangle hath his three angles greater then two Right angles, from whence it appears, that knowing two, you cannot know the third, as in plaine Triangles.

9 If the Arch of a great Circle ſhall cut the Arch of another great Circle, it ſhall form two right angles, or two angles equall to two right angles.

10 If two Arches of great Circles ſhall interſect one another, the verticall angles ſhall be equall.

11 If two ſides of a Sphæricall angle be continued, they ſhall each interſect again *per Semicirculum,* and ſhall form an angle equall to the former oppoſite angle.

12 In a Rectangle Sphæricall Triangle, the ſides are of the ſelf-ſame affection, that the oppoſite angles are of.

13 In a Rectangle Sphæricall Triangle, if one ſide be a Quadrant, the Hypothenuſall ſhall be a Quadrant, if both be of the ſame affection, the Baſe ſhall be leſſer then a Quadrant, if they be of divers affections the Baſe ſhall be greater then 90, *& contra.*

14 In an Oblique angled Sphæricall Triangle, if the angles at the Baſe be of the ſame affection, the perpendicular let down from the third angle, ſhall fall within, if they be divers it ſhall fall without.

Theſe generall affections being knowne, we will next proceed to the Particular.

CHAP IV.

PROP. I.

In all Sphæricall Rectangle Triangles having the ſame acute angle at the Baſe.

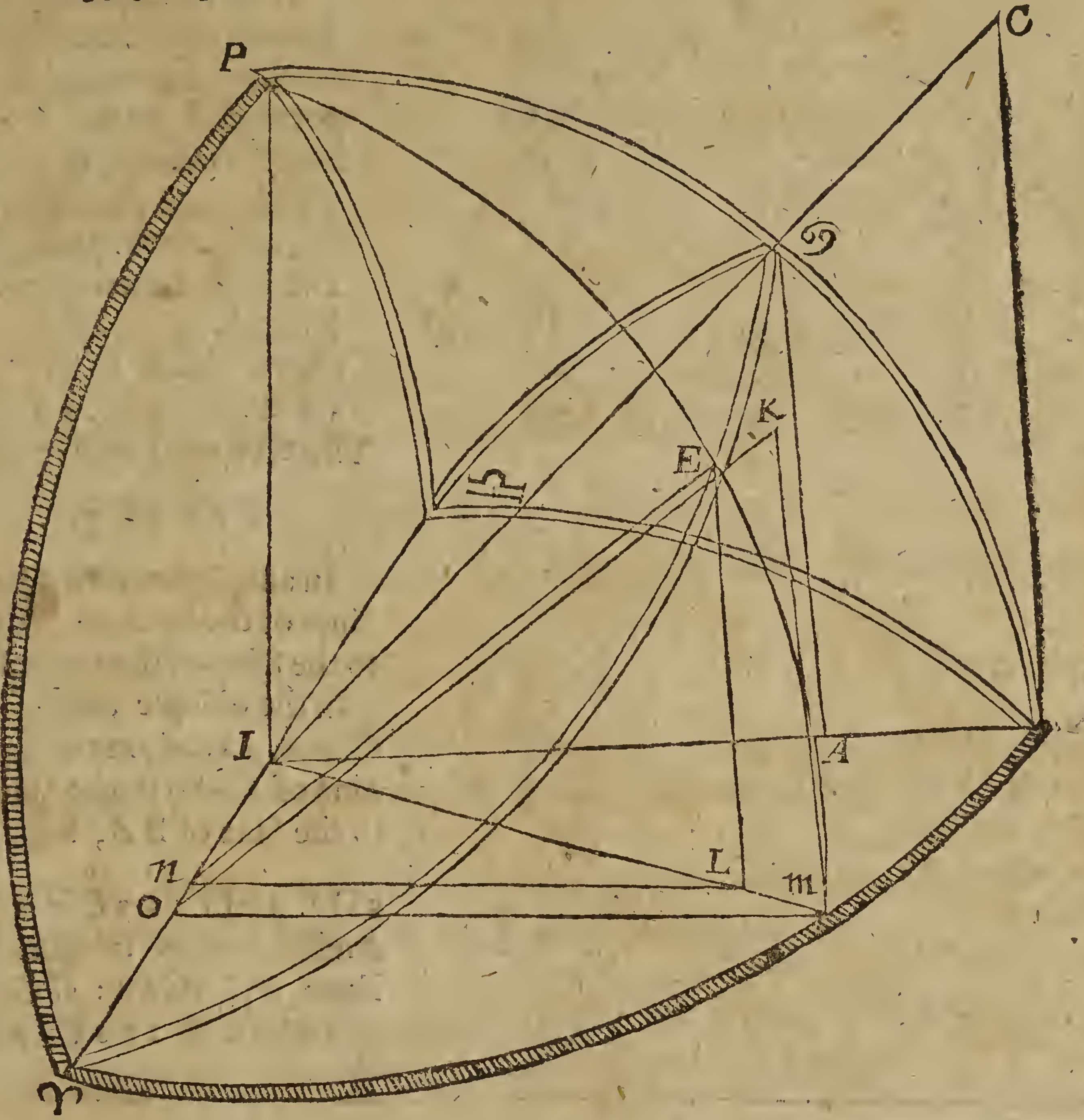
The Sines of the Hypothenuſaes are proportionall to the Sines of their Perpendiculars.

Let ♎ Æ ♈ P be $\frac{1}{4}$ of the Sphære, ♈ Æ ♎ half of the Æquinoctiall Plane, whoſe Pole is P. ♈ ♋ ♎ $\frac{1}{2}$ of the Ecliptique, ♈ P ♎ $\frac{1}{2}$ of the Æquinoctiall Colure, P ♋ Æ $\frac{1}{4}$ of the Solſtitiall Colure, P M, $\frac{1}{4}$ of ſome other Meridian. Now becauſe the Colures cut the Æquinoctiall at right angles, the Ecliptique at oblique angles, in this quarter of the Sphære, there are found two Rectangle Sphæricall Triangles, ♋ ♈ Æ, and E ♈ M, whoſe Hypothenuſaes are ♈ ♋ and ♈ E, the Catheti ♋ Æ, E M, the Baſes ♈ Æ and ♈ M. They have alſo the acute angle ♈ common to them both. Now then, the Sines of the Hypothenuſaes are I ♋ the whole Sine, and the Sine N E; the Sines of the Perpendiculars ♋ A, and E L.

Becauſe the Triangles ♋ I A, and N L E are alike, (for that ♋ A, and E L, are Perpendiculars, and ♋ I and E N Parallels, having the ſelfe ſame inclination, being both in the Plane of the Ecliptique) therefore N E L and ♋ I A are æquiangled: Hence,

s I ♋ : s N E :: s ♋ A : s E L, & contra.
Therefore it followes in the Triangle ♈ E M.
R : s ♈ E :: s ♈ : s E M.

As the Radius, is to the Hypothenuſe, ſo the Sine of any other angle, to the Sine of his oppoſite ſide.



PROP. 2.

In Rectangle Sphæricall Triangles, having the ſame acute angle at the Baſe.

The Sines of the Baſes, and Tangents of the Perpendiculars are proportionall.

In the preceding Scheme, and the ſame Triangles ♈ ♋ Æ, and E ♈ M ; I Æ, and O M, are Sines of the Baſes, C Æ and K M, Tangents of the Perpendiculars.

Becauſe the Triangles I C Æ, and O K M, are ſimilar, according as it was before demonſtrated : Therefore, s I Æ. s OM : : t C Æ. t R M. *& contra.*

Hence another Conſectory.

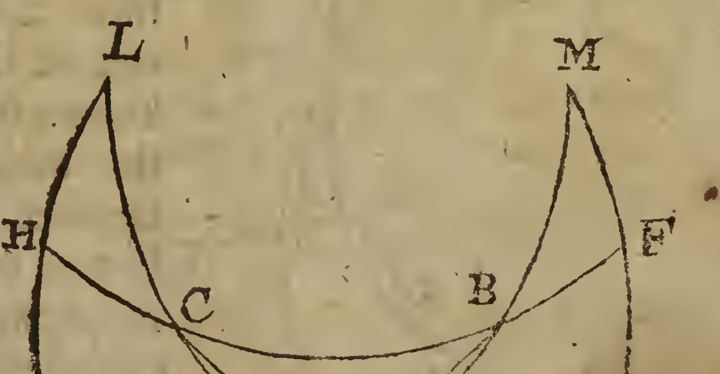
R. s ♈ M : : t ♈. t E M.

In any Sphærical Rectangle Triangle, *as the Radius, is to the Sine of one of the Sides, ſo is the Tangent of the angle adjacent to the ſaid ſide; to the oppoſite ſide.*

PROP. 3.

If from two angles of a Sphæricall Triangle, Perpendiculars be let down to the oppoſite Sides, the Sines of the Angles and Perpendiculars are directly Proportionall: by the 1.

In the Triangle A B C, from the Poles L and M, draw the Perpendiculars C E and B D, upon C A and B A, continued to Quadrants.



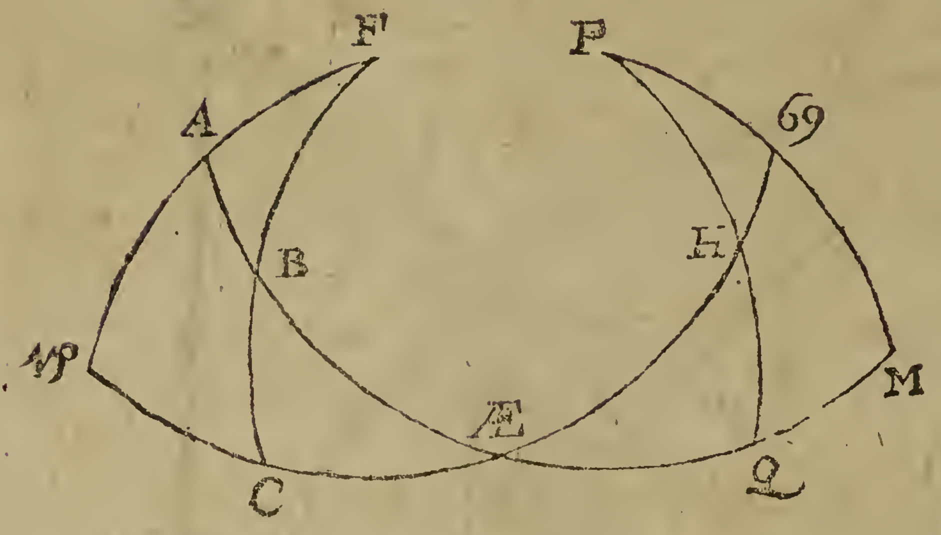
Then by the Corolary of the firſt:

R. s C B : : s B. s C E.

And R. s C B : : s C. s B D.

Therefore by the 11. 5. s B : s C E :: s C. s B D

PROP. 4.

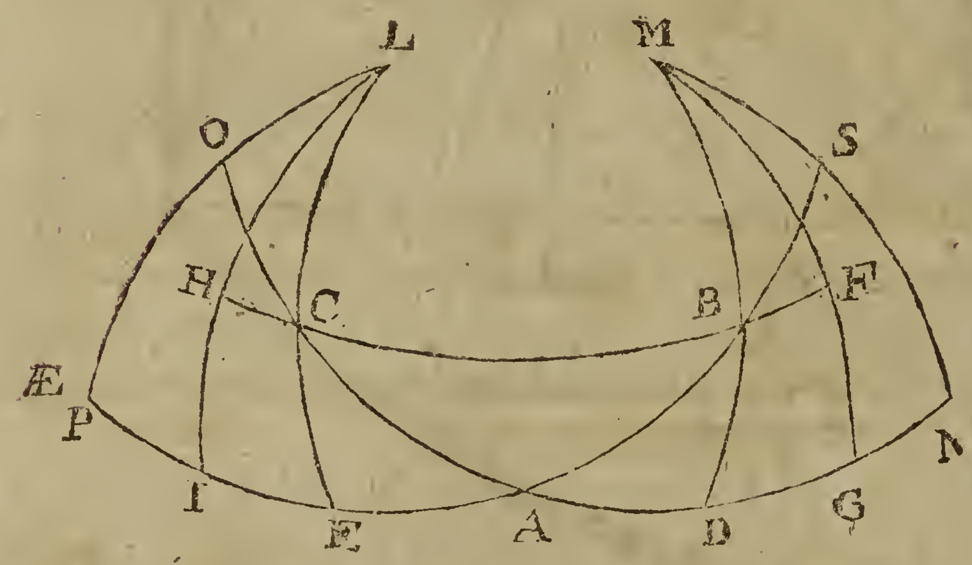


If two Perpendicular Arches ſubtend equall angles, the Sines of the Perpendiculars are Proportionall to the Sines of the Hypothenuſaes, *& contra.*

Let B A C, be equall to H Æ Q, and the Perpendiculars B C and H Q drawn from the poles P and F.

s ♋ M. s ♋ Æ : : s H Q. s H Æ.
s A ♑. s A Æ : : s B C. s B Æ.
Therefor, sHQ. sHÆ :: sBC. sBÆ.

PROP. 5.



In any Sphæricall Triangle, the Sines of the ſides are Proportional to the Sines of their oppoſit angles.

In the oblique angled Triangle C B A, As the Sine of B, is to the Sine of C, So is the Sine of C A, to the Sine of B A, for.

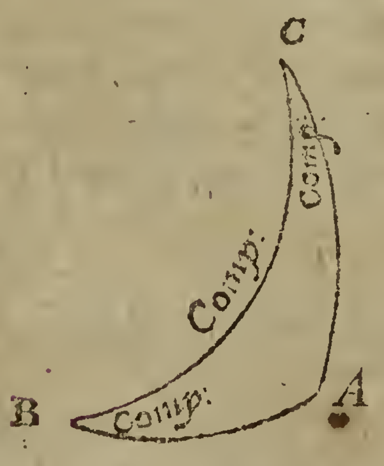
s H I. s F G : : s C E. s B D. p 3
And s C A. s B A :: s C E. s B D. p 4
Ergo, s H I. s C A : : s F G. s B A. or
s B. s C A : : s C. s B A.

CHAP. V.

These Demonſtrations being premiſed, which are ſufficient for our purpoſe ſince we doe follow that Method the treſ-noble *Neper*, hath left us, which Maſter *Norwood* did ſtrictly purſue, and *Ulach* did touch upon: the whole Doctrine, whereof Dr. *Scarborough* hath made wonderfull eaſie and pleaſant, whereby thoſe tedious Demonſtrations are avoided, and thoſe Caſes ſo burthenſome to the memory compriſed almoſt into one. I ſhall in one ſheet or two make it plaine and eaſie too.

In Rectangle Sphæricall Triangles.

1. There are five circular parts, beſides the right angle or Quadrantall ſide, which we ſhall ſpeak of anon (which is not accounted amongſt the circular parts) whereof three of them, which are fartheſt ſited from the Right angle in this, or Quadrantall in that below, he calleth Complements, that he might fit them to two Univerſall Propoſitions, which we may make one. The parts are thus, Complement B, Complement C, Complement B C, Side B A, Side C A.



2. Becauſe two termes are given to finde a third, conſider theſe Termes according to their circular parts, and one of them will be middle part betwixt his extreames, known from the very poſition of the termes; if therefore this middle part be immediately conioyned with his extreames, call them extreames conioyned, as A C. C, B C. But if other parts, which come not into queſtion, ſhall intervene & diſioyn the ſaid parts, let theſe parts be called extreames diſiunct. As A C, B, C, here B is diſioyned on both ſides, by B C and B A. So is it in B C, B A, C A,

where B C is middle part, C A and B A, extreames diſiunct. And take notice, that B A and C A are conioyned, becauſe the Right angle is not accounted amongſt the circular parts.

3 Before we reſolve this kinde of Triangle, diſcerne the middle part, and the extreames whether coniunct, or diſiunct, if they be all united, the middle is the middle part coniunct, and the extreames, the extreame parts coniunct. If againe, anypart be diſioyned, thoſe parts conſidered are diſioyned; that which ſtands by it ſelfe being ſegregated on either ſide is the middle part diſioyned, and the extreames, extreame parts diſioyned.

VNIVERSALL PROPOSITION.

The Sine of the middle part and Radius, are reciprocally Proportionall, with the Tangents of the Extreames conjunct, and with the Co-ſines of the Extreams diſjunct.

Namely, *As the Radius, to the Tangent of one of the extreames conjoyn'd, ſo is the Tangent of the other extream conjoyn'd, to the Sine of the middle part.* And alſo.

As the Radius, to the Co-ſine of one of the Extreams diſ-joyn'd, ſo the Co-ſine of the other extreame diſ-joyn'd, to the Sine of the middle part.

5 Therefore, *If the middle part be ſought, the Radius is in the firſt place, if either of the extreames, the other extreame put in the firſt place.*

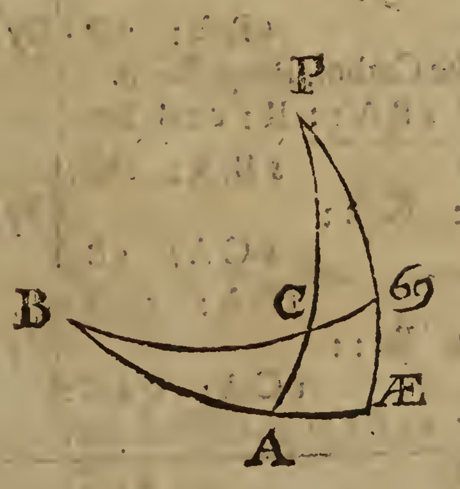
6 This Propoſition is demonſtrated by induction in all their Caſes, and is coincident with them in the caſes of extreames diſiunct. In coniunct we differ thus, where they ſay, As the Radius to the Tangent, we ſay, as the Co-tangent to the Radius, & *inter ſe & contra*, which we made evident before.

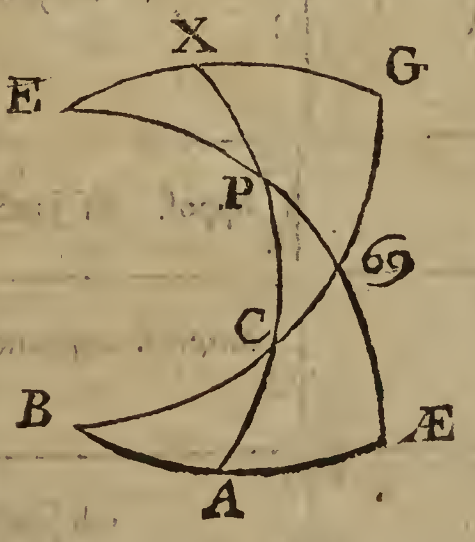
Note, that when a Complement in the Propoſition doth chance to concure with a Complement in the circular parts, you muſt take the ſine it ſelfe, or the Tangent it ſelfe, becauſe.

C S of the C S = S.
And, C T of the C T = T.

7 Here followes the Type of all the Varieties in the ſixteen Caſes.

Note that C A is the Cathetus, or Perpendicular, B A the Baſes, B C the Hypothenuſall, C the angle at the Cathetus, B the angle at the Baſe.





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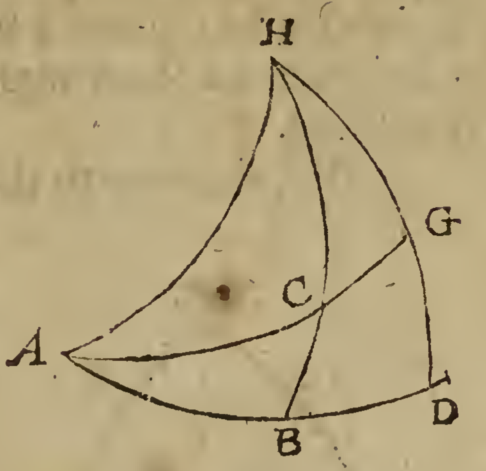
	Data.		Quæſita.		Analogia.	Demonſtra.
	Sides	Augle	Sides	Angles		
1	BA BC: or CA		CA BA		BA csCA cs R :: csBC : CA csBA Extreams diſ-junct.	By 1. Prop.
2	BC	B C	CA oppoſ. BA		sB: sCA: R: sBC :: sC: sBA: Extreams diſ-junct.	By 5. Prop.
3		B: C	BA: or CA		sC: csB :: csCA: R: sB: csC :: csBA: Extreams diſ-junct.	By 1. Prop.
4	BA conterm. CA	B C	CA oppoſ. BA	Extreams conjunct.	R: tB :: sBA: tCA: R: tC :: sCA: tBA: Fit it with the Propoſition Univerſall it will be. ctB: R: &c.	By 2. Prop.
5	CA oppoſ. BA	B C	BA conter. CA	Extreams conjunct.	tB: tCA :: R: sBA: tC: tBA :: R: sCA: Suit it to the Cath. Propoſ. R: ctB :: &c.	By the foregoing Caſe.
6	BC	B C	BA conter. CA	Extreams conjunct.	csB: tBA: R: tBC :: csC: tCA: By the Cathol. Propoſition. ctBC: R :: &c.	By 2. Prop.
7		B: C	BC:	Extreams conjunct.	tB ctC: R :: csBC: tC ctB: By the Catho. Propoſiton. R: ctB :: &c.	By 2. Prop.
8	BA: CA		BC		R: csBA :: csCA: csBC: Extreams diſ-junct.	By the 1. Caſe.
9	BA oppoſ. CA	C B	BC	Extreams diſ-junct.	sB: sCA :: R: sBC: sC: sBA	By 5. Prop.
10	BA Conterm. CA	B C	BC	Extreams. conjunct.	ctBA csB: R: :: ctBC: ctCA csC: By the Cathol. Propoſition. tBA: R :: &c.	By 1. Caſe.
11	BA conterm. CA	B C	C oppoſ. B	diſ-junct	sB csBA: csC: R: :: sC csCA: csB:	By 3. Caſe.
12	BA oppoſ. CA	C B	B conterm. C	diſ junct.	csBA: csC sB: :: R: csCA: csB sC:	By the preceding.
13	BA: CA		B C	conjunct	sBA: tCA: sC: R:: sCA: tBA: sB: By the Cathol. Propoſition. tCA: sBA :: R: ctB &c.	By the 5. Caſe
14	BA BC CA		C oppoſ. B	diſ-junct.	sBA: sC: sBC: R :: sCA: sB:	By 5. Prop.
15	BA BC CA		B conterm. C	conjunct.	tBA: csB: tBC: R :: tCA: csC: Or R: ctBC: p. Cathol. &c.	By 6. Caſe.
16	BC	C B	B C	conjunct	C ctB: R: t :: csBC: B ctC: per Cath. ctC: R :: &c.	By 7. Caſe.

8 If you meet with a Quadrantall Triangle, the worke will be the ſame if you reduce it to a Rectangle, becauſe there are 5 Circular parts, the three remoteſt whereof call Complements, as before. As in the Quadrantall H C A, H A is 90 degrees, and no Circular part here: Complement of C H, Complement of C, Complement of C A, A and H.



Take C B, the Complement of the Complement of H A B, meaſure of H, G A D, Complement of H AC A C B Complement of the Complement of H C A.

CHAP. VI.

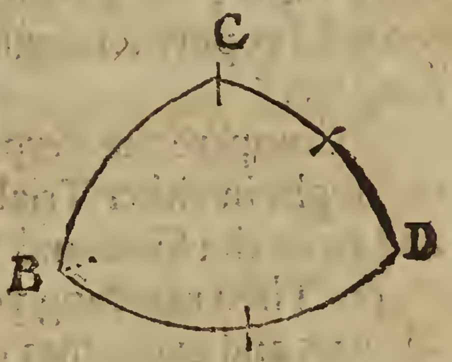
In Oblique Angled Sphæricall Triangles.

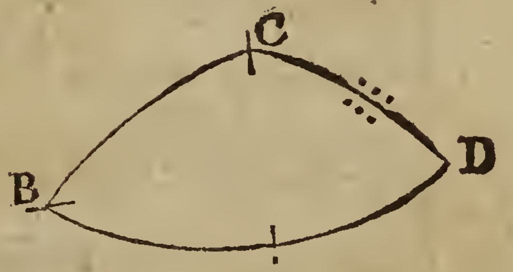
1 IF the *Data*, and *Quæſita* be oppoſed, they are to be reſolved (by the 5 Prop.) when an angle is ſought.

sBD: sB :: sCD: sB.

Or, *è converſo*, when a Side is ſought.

sC: sBD :: sB: sCD.





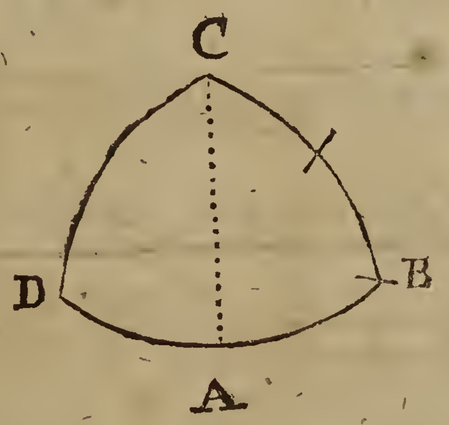
2 There are 10 other Caſes, which muſt be reſolved by the aid of two Analogies at the leaſt, & that by reducing of the Obliqe into two Rectangles; by the demiſſionof a Perpendicular, So that we muſt handle methodically, firſt ſome Conſiderations about drawing the Perpendicular, which muſt divide the Triangle into two.

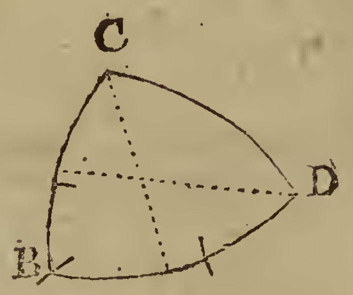
Secondly, what muſt be found out in the firſt Operation; and laſtly, how to reſolve the Queſtion by the ſecond Operation.

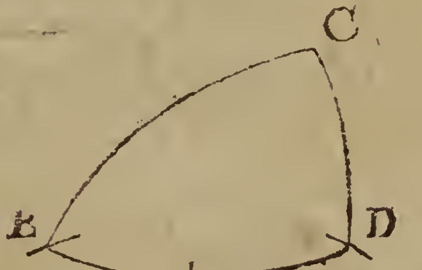
3 We may give a generall Rule in the letting fall the Perpendicular, *viz.* that it be ſo modificated, that we may reſolve the Queſtion by two Operations only.

But to do it readily, take this precept.

4 Draw the Perpendicular from the Extremity of the given ſide, in whoſe other Extremity there is a given angle, or adjacent. As C A from C, ſubtending the adjacent angle B. This Canon admits of a limitation in two Caſes, *viz.* when two angles with a ſide comprehended are given, to find another ſide; or ſecondly, when two ſides and an angle comprehended are given, to finde any other angle, in the firſt, of theſe Caſes, let the Perpendicular be drawn from the extremity of the given ſide, to ſubtend the given angle; in the latter to be drawn as before, and to ſubtend the angle required.



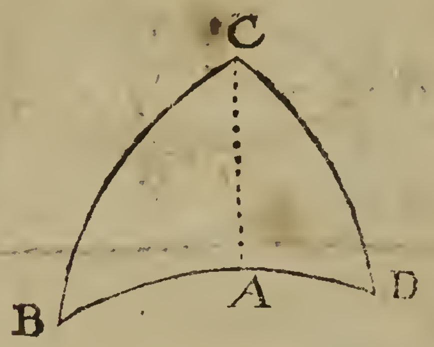




5 This being duely drawn, proceed then unto the firſt Analogie, which is always to be performed in that Rectangle partiall Triangle, where two things are known, beſides the Right angle, and therein you muſt ſearch out either a verticall angle or a Baſe.

6 If the Queſtion propounded be to find an angle, let the verticall angle be firſt ſought, unleſſe the Perpendicular be drawn to a known Side. But if the Queſtion propounded be to ſeeke a ſid, firſt finde a Baſe, unleſſe the Perpendicular be protracted from a known angle: in either exception ſeeke the contrary by the Catholike Propoſition.

7 Laſtly, we come to the ſecond Analogie, which conſiſteth in the compariſon of two Homogeneall terms in each Triangle, with the verticall angles, or the Baſes, for they are proportionall in this, and likewiſe in all the other caſes.



As in the Triangle B C D, reduced to two Rectangles, I ſay that in the Sines and Tangents of the circular Parts, it ſhall be, as A B : B :: A D : D, &c. for by the Catholike Propoſition.

In A B C } t A C. R. :: s A B. ct. B.
In A D C } t A C. R. :: s A D. ct. D.

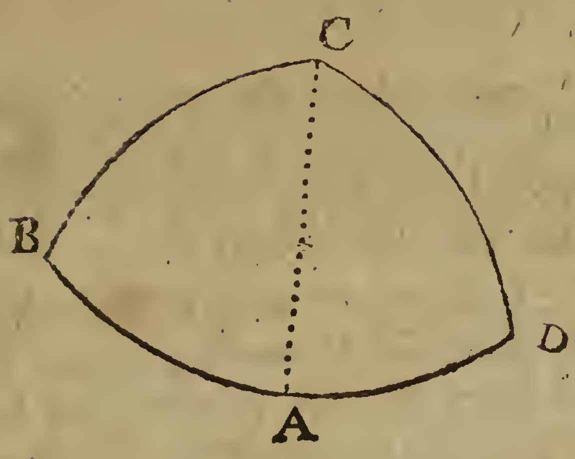
Therefore (by the 11 of the 5 Elem.)
s A B : ct. B :: s A D : ct. D

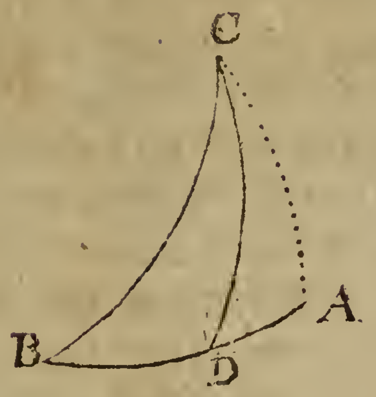
8 So you ſee that having found according to the condition of the Queſtion, a verticall angle, or a Baſe in the firſt operation, you muſt next proceede to order your ſecond Proportion aright amongſt the homogeneall termes, as Baſes, or Hypothenuſaes, &c.

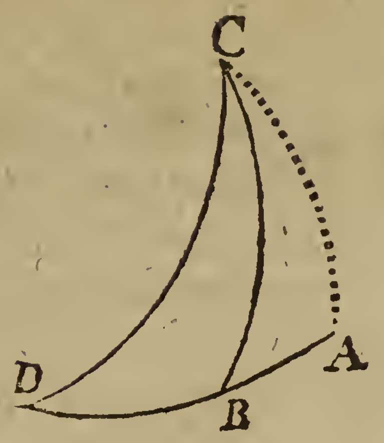
9 Compare the Perpendicular with each homogeneall term, whether it be given or ſought in either Triangle, to diſtinguiſh betwixt the middle part and the Extream, and to fit the Sines and Tangents to them accordingly.

10 Then rejecting your Perpendicular and Radius in each compariſon: the middle part and extreames of the one Triangle, ſhall be proportionall to the middle and extreames in the other, as it is illuſtrated in theſe 8 Caſes.

Data





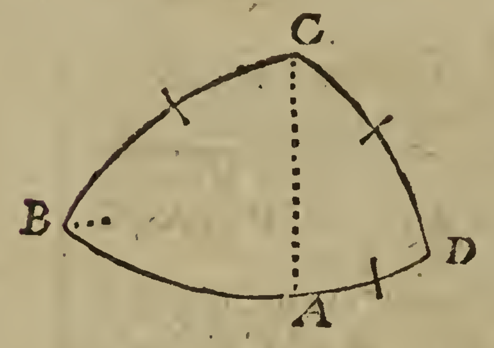


	Data.		Quæſita.		Analogia prima	Analogia ſecunda & Demonſtration
	Side	Angle	Side	Angle		
1	BC DC	oppoſ. B		Includ. C	ctB : R :: cs BC : ctC. Note if the Perpendicular fall within BCA + CAD = BCD. If without DCA — BCA, or BCA — DCA = BCD.	R. tCA :: ct BC. cs C. R. tCA :: ctCD csACD *Ergò*, ct BC : cs BCA :: ct CD : cs ACD then BCA + ACD (1a.) & BCA — ACD (2a) but DCA — BCA (3a.) = C.
2	BC CD	op. B	BD: 3. ſide Note againe.		ct BC. R :: csB : t. BA. BA + AD in 1a. BA — DA 2a. DA — BA 3a = DB	csCA. R. { csBC. csBA csCD. csAD *Ergò*, csBC. csBA :: csCDcs AD.
3	BC BD	Includ. B	D oppoſ.		ct BC. R :: cs B. tBA.	sBA. ctB tCA. R :: sAD. ctD. *Ergò*, sBA. ctB :: sAD. ctD.
4	BC BD	Includ. B	DC		ct BC. R :: cs B. tBA.	csBA. csBC. R. csCA :: csAD. csCD *Ergò*, csBA. csBC :: csDA. csDC.
5	BC	B D	BD includ.		ctBC. R :: cs B. tBA. Obſerve the former caution whether the Perpend. fall within or without, whereby you may know whether to take the Summe or difference as the figures will direct you above.	B BA R. tCA :: ct s D AD. *Ergò*, ct B. sBA :: ct D. sAD.
6	BC oppoſ	B D		C	ctB. R :: ctBC. ct CA.	csB. sBCA. cs CA. R. csD. sACD. *Ergo*, csB. sBCA :: csD. sACD.
7	B and C and includ. BC		find DC op.		find BCA. ctB. R :: cs BC. ctBCA.	csACB. ctBC tAC. R. :: csACD. ctDC. *Ergo*, csACB. ctBC :: csACD. ctDC
8	B and C and includ. BC.		D		findBCA. ctB. R :: csBC. ctBCA.	sACB : csB. R. csCA :: sACD : csD. *Ergo*, sACB. csB :: sACD. csD.

11 *Three ſides being given, to finde an Angle.*

Suppoſe the Perpendicular to fall from any other angle, as C, and you may finde the ſegments of the Baſe B A and A D this way. As the Tangent of the half ſumme of the Baſes, to the Tangent of half the ſumme of the ſides, So the Tangent of half the difference of the ſides, to the Tangent of half the difference of the Baſes.

Now then having found the ſemi-difference of the Baſes, if you adde it to the ſemi-ſumme of the Baſes, you ſhall have the greater ſegment, but ſubſtracted from the ſemi-ſumme, you have the leſſer, then by the Catholike Propoſition you may find the Angle deſired.



Note, if the Perpendicular fall without, then the ſemi-ſumme will be the ſemi-difference, *& contra.*

Illuſtration in Numbers.

In the Triangle B C D, the ſide B C is 67^{d} 34′, the ſide C D 45^{d} 31′, and the Baſe B D 82^{d} 8′, therefore the half ſumme of the Baſes is 41^{d} 4′ 0″, the half ſumme of the ſides 56^{d} 32′ 30″ and the half difference of the ſides 11^{d} 1′ 30″. Hence,

As the Tangent of 41^{d} 4′ 0″, 9,940183
To the Tangent of 56^{d} 32′ 30″, 10,179903
So the Tangent of 11^{d} 1′ 30″, 9,289662
19,469565
To the Tangent ½ dif. of the Baſes 18^{d} 41′ 38″. 9,529382

Semi-ſumme of the Baſe 41^{d} 4′ 0″. } The greater ſegment A B 59^{d} 45′ 38″.
Semi-difference of the Baſe 18 41 38. } The leſſer ſegment A D 22 22 22.

Then by the Cathol. Propoſition. { Tangent of B C 67^{d} 34′. 10,384207
Radius 90^{d}. 10,000000
Tangent of A B 59^{d} 45′ 38″. 10,234379
Co-ſine of the Angle B 44^{d} 54′ 34″. 9,850172

But becauſe I have followed in the enſuing Treatiſe another kind of Reſolution, I ſhall give you that, whoſe Demonſtrat. you may find in Mr. *Gelibrands* Trigonometry.

Sine of B D 82^{d} 8′. 9,995893 } I Summe 19,961717
Sine of B C 67 34. 9,965824 } I I Quadrat of the Rad. 20,000000
Dif. 14 34.

C D 45′ 31′ ″
Difference of B C and B D 14 34
Summe 60 5
Dif. 30 57
Semi-ſumme 30 2 30 9,699516
Semi-difference 15 28 30 9,426215
I I I Summe 19,125731

I Summe 19,961717
I I Quadrat of the Radius 20,000000
I I I Summe 19,125731
I I I I Quadrat of the Sine of ½ the angle ſought 19,164014
Which bi-ſected giveth 22^{d} 27′ 17″. 9,582007
whoſe Double is the Angle B. 44 54 34. As before.

12. If three Angles be given to find a ſide, you muſt make permutation of the angles into ſides, and then it will co-incidere with the precedent Caſe.

The End of *Trigonometry.*

CHAP.

CHAP. VII.

FOr the uſing of the Canon, and eaſe of Multiplication and Diviſion of Aſtronomicall Fractions, I will borrow Mr. *Oughtreds* Table *Pag.* 1. which is the very foundation of Logarith. and Aſtronomicall Arithmetick.

5	4	3	2	1	0	$\overline{1}$	$\overline{2}$	$\overline{3}$	$\overline{4}$	$\overline{5}$
1	1	1	1	1	1	1	1	1	1	1
0	0	0	0	0		0	0	0	0	0
0	0	0	0				0	0	0	0
0	0	0						0	0	0
0	0								0	0
0										0

0 Index of all numbers under 10.
1 Index of all under 100, &c.

I need not explaine it, ſince he hath done that, and many others, ſo amply and ſo learnedly already.

But to thoſe that have not ſeene it, obſerve that the upper numbers are all in Arithmeticall proportion, and do deſcend 5. 4. 3. 2, &c. The lower are in Geometricall Progreſſion, whether you begin as they encreaſe, from the right to the left, or decreaſe from the left to the right, in decuple Progreſſion. This being the groundwork of Logarithmes, as he hath in another place demonſtrated, where Addition and Subſtraction in that upper, which are Indices or Logarithmes, do anſwer to Diviſion and Multiplication in the inferiour, *viz.* $3 + 2 = 5$, $1000 \times 100 = 100000$, &c.

To adde Logarith. or artificiall numbers, is the ſame with Multiplication of naturall, or true numbers. If the Logarithmes be of the ſame kind, *viz.* all affirmative, or above 0, or all negative, that is leſſe then 0, the Aggregate muſt be of the ſame kind, As 4 to $2 = 6$. h : e : $10000 * 100 = 1000000$. $\overline{4} + \overline{2} = \overline{6}$ or h:e: |00001 * |01 = |000001.

But if they be of divers kindes, then one will be in nature Subſtractive, and then take the difference of the Logarithmes of the factors for the Logarithme of the fact, prefixing the affection of the greater Logarithme, as $3 + \overline{2} = 1$ but $\overline{3} + 2 = \overline{1}$

In Subſtraction of Logarithmes, or diviſion of true numbers, if they be homogeneall, i. e. of the ſame kinde, take their difference for the Logarithmes of the Quotient, which difference muſt be of the ſame kinde with the numbers given, as $4 - 2 = 2$ or $\overline{4} - \overline{2} = \overline{2}$. But if they be divers, adde their Logarithmes, the ſumme ſhall be the Logarithme of the Quotient, which muſt be affected as the greater Log. whether it be ſubducend, or *numerus è quo.*

$$\begin{array}{lr@{\qquad}lr}
\text{So out of} & 0 + 3 & & 0 - \overline{3} \\
\text{take} & 0 - \overline{2} & \text{but} & 0 + 2 \\
\hline
\text{dif.} & 5 & \text{dif.} & \overline{5}
\end{array}$$

To ſquare or Cube any Number $1 * 2 = 2$ Logarith. of the Quadrate. Alſo $1 * 3 = 3$ Logarith. of the Cube, &c. and therefore to extract a Root $\frac{2}{2} = 1$ the Log. of the quadrate ſide, alſo $\frac{3}{3} = 1$ the Cubick ſide &c.

In Multiplication of Aſtronomicall Fractions, 0 is the note of Degr. all above it is the note of *Sexagena's* as 1 the note of *Sexagena prima*, 2 the note of *Sexagena ſecunda*, 3 the note of *Sexagena tertia, &c.* $\overline{1}$ the note of *Sexageſima prima, &c.*

To multiply therefore, is onely to adde the Indices, to divide, to ſubſtract the Indices, &c. and you ſhall have the ſpecies reſulting, in either an Example will ſuffice.

Eexample of Multiplication.

	0	$\overline{1}$	$\overline{2}$	$\overline{3}$	$\overline{4}$
	17°.	24′	10″.	‴	⁗.
	10	11	3		
			52	12	30
	3	11	25	50	
2	54	1	40		
1	0	$\overline{1}$	$\overline{2}$	$\overline{3}$	$\overline{4}$
2	57	13	58	2	30

Example of Diviſion.

1 0 1 2 3 4
2 57 13 58 2 30
10 11 3
2 53 7 51 (17°. 24′. 10″.
1 4 6 7 2 30.
10 11 3
4 4 25 12
1 41 50 30.
10 11 3
1 41 50 30.

In the Calculation of the motions of the Planets, it often times happeneth that the Anomalie of the Excentrique conſiſts not always of even Signes and Degrees, but for the moſt part, hath min. and ſeconds annexed, therfore, that the Æquation in the Tables may readily be found, we are to ſeeke the Proportionall part by the Sexagenarie Table.

For as one Deg. or 60′, to the Variation, or Difference of Æquations anſwering thereto, So is the minutes and ſeconds abounding, or exceeding the Degree of the Anomalie, to the Proportion of the Æquation ſought for.

Suppoſe the Anomalie of ♂ be 1ˢ. 10ᵈ. 15′ 25″. and his Equation be required.

Operation.

The Anomalie of ♂ {1ˢ. 10ᵈ. / 1 11.} Equations {6ᵈ. 13′. 12″. / 6 21 14

The Difference of Equations is 8 2.

Then I ſay, If one degree or 60′. give 8′. 2″. what ſhall 15′. 25″. give?

The Reſolution. 15′. 25″.
8 2
0 50
0 30
3 20
2 0
2 3 50 50. The Proport. Part required.

Equation anſwering to 1ˢ. 10ᵈ. is 6ᵈ. 13′. 12″.
Part Proport. Adde, 2 3 51.
Equation æquated to 1ˢ. 10ᵈ. 15′ 25″. is 6. 15. 15. 51.

In the Canon of artificiall Sines and Tangents.

Supoſe the Tangent given be 9619789, and it is required to finde the Arch correſponding thereunto. The next leſſer is 9619720
Next greater 9620076

The Worke {9619789} 69 / 9619720 / 9620076} 356
356. 69. :: 60″. 12″.
Therefore the Arch ſought is 22ᵈ. 37′. 12″.
Then to find the Tangent of 22ᵈ. 37′. 12″.

Arches {22ᵈ. 37′ – – – – 9619720 / 22 38 – – – – 9620076} Difference 356 ad 60′.
60″. 12″ :: 356. 70.
Ergò, 9619720 + 70 = t. 22ᵈ 37′ 12″.

In the Chiliads.

The Number given is 953290. and the Logarithme thereof is required.

Numbers {95322.00 / 95333.00} Logarith. {979184 / 979229} Dif. 45 ad 100.
100. 45. :: 90. 40½.
Ergò, to Log. 979184
Adde 40½
Log. anſwering to the number given 5,979224½ *& vice verſa.*

And here you muſt note, that the firſt figure towards the left hand is the Caracteriſtique, which we account 0, or nothing, when the number given is under 10, then from 10 to a 100 it is accounted 1, from 100 to 1000, 2, from 1000 to 10000, 3 from 10000 to 100000 4, and ſo on, whereby you may perceive its eaſie to diſcerne the Cha$^{\text{racter}}$iſtique of any number.

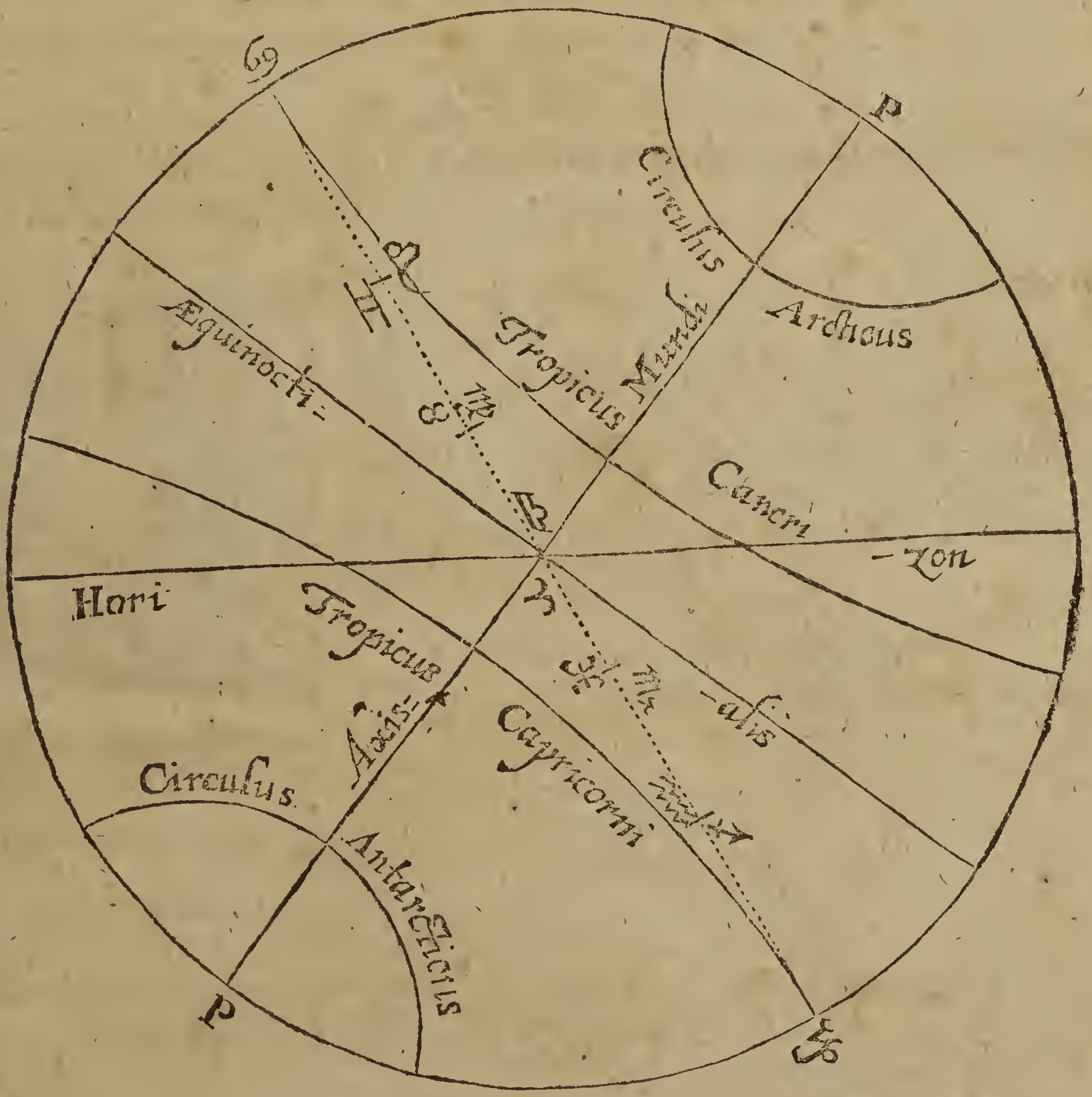
THE END OF THE FIRST PART.

HARMONICON COELESTE:

THE SECOND BOOK.

Containing ſundry Propoſitions Aſtronomicall,
appertaining to the Firſt Motions, Being all of extraordinary uſe,
Whereof few of them have been, as yet, treated of in
the ENGLISH TONGUE.

Sphæra Materialis.



Fœlices animæ, quibus hæc cognoſcere primum,
Inq; domos ſuperas ſcandere cura fuit.

LONDON:
Printed by ROBERT LEYBOURN, for the
Company of STATIONERS, 1651.

E 2

HARMONICON COELESTE:

The Second Book:

CHAP I.

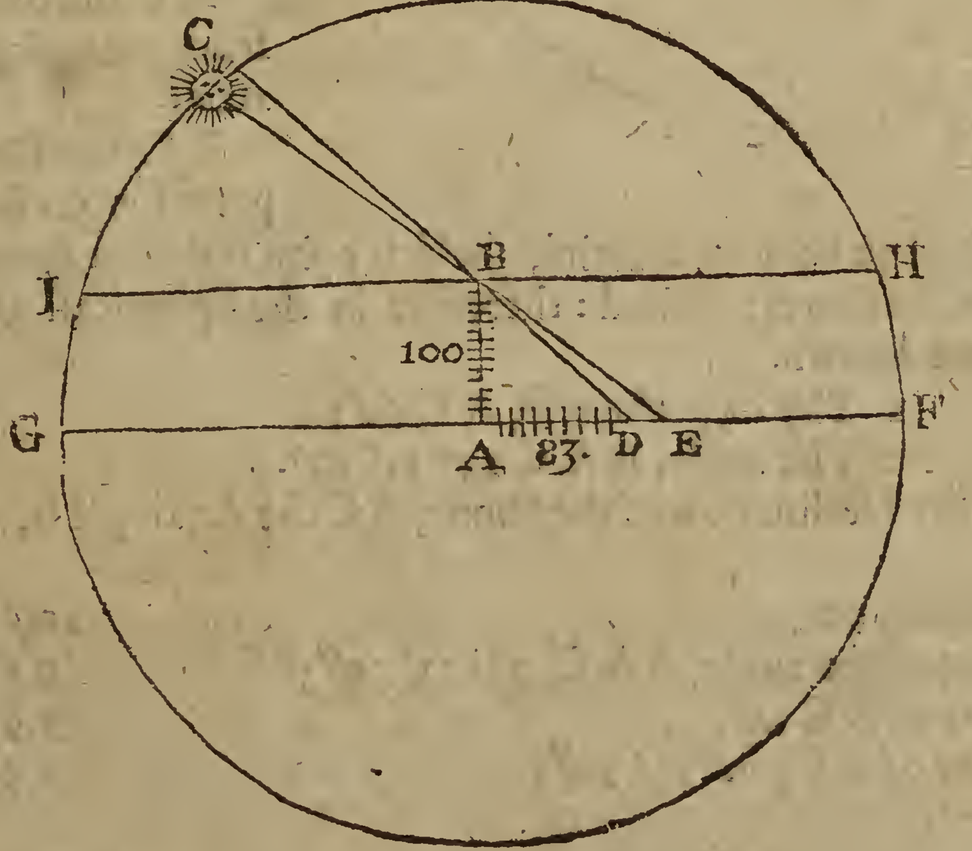
To finde the Altitude of the Sun above the Horizon at any time, by the ſhadow of a Gnomon or Staffe ſet perpendicularly.

IN the annexed Diagram. F A G, repreſents the Horizontall Plane. C, the place of the Sun. A B, a Staffe or Gnomon, erected perpendicular to the Horizon F A G, which caſteth its ſhadow to the point D.

For illuſtration ſake, let us ſuppoſe the length of the ſtaffe A B, to be 100 parts, and the Longitude of the ſhadow thereof A D be 83, then in the Rectangle Triangle A B D, is known.

1 The ſide A B, 100 parts.
2 The ſide A D, 83 parts.

Therefore, to finde the angle C D G, or altitude of the upper edge othe Sun, I ſay,



As the Longitude of the Shadow, A D 83,	1,919078
To the Longitude of the Staffe, A B 100;	2,000000
So the Radius, 90 degrees,	10,000000
To the Tangent of the Angle, A D B 50^{d} 18′ 26″:	10,080922

From which taking the Semidiameter of the Sun 16′ 27″, there remains 50^d 1′ 59″ the true Altitude of the Center of the Sunne.

After this manner, if you obſerve the greateſt Meridian altitude of the Sunne, the 11 of June and 10 of December, you ſhall by the Difference of them finde the diſtance of the Tropicks, greateſt Declination of the Sunne, Elevation of the Equator, and Latitude of the Place.

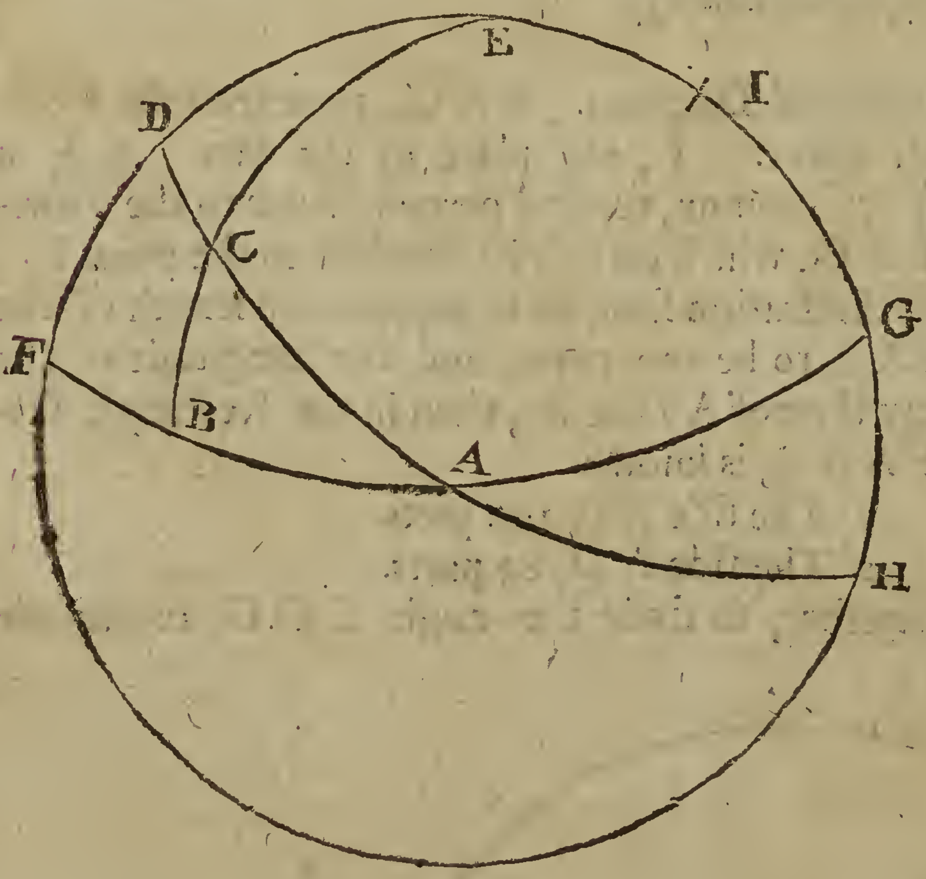
EXAMPLE.

At *London*, the greateſt meridian Altitude of the Sun, is 61^d 59′ 30″, and the leaſt 14^d 56′ 30″.

	D	′	″
The Suns greateſt Meridian altitude taken Iune 11 is,	61	59	30
The Suns leaſt Meridian altitude taken December 10,	14	56	30
Diſtance of the Tropicks,	47	3	0
Greateſt Declination of the Sunne,	23	31	30
Elevation of the Æquator,	38	28	0
Altitude of the Pole.	51	32	0

CHAP. II.

The greateſt Declination of the Sunne being given, to finde the Declination of any point of the Ecliptique.



IN this Figure.

DFHG, denotes the Solſtitiall Colure.

F B A G, the Æquator.

D A H, the Ecliptique.

I, the Pole of the Ecliptique.

E, the Pole of the Æquator.

C E B, a Meridian line paſſing from E through the Sun at C, and falling upon the Æquator F A G, with right angles in the point B.

DAF, the angle of the Suns greateſt Declination.

A C, the diſtance of the Sun from the Æquinoctiall point Aries.

B C, the Declination of the point ſought for.

Now ſuppoſe the Sun be in 0^d Gemini, (which point is diſtant from the Equinoctiall 60) and his declination is required: therefore in the Sphæricall Rectangle Triangle, A B C, we have known.

1 The Hypothenuſe, A C 60^d:

2 The angle, B A C 23^d 31′ 30″.

Then to find the Declination of the Sunne, B C the Analogie is,

As the Radius, 90^d,	10,000000
To the Sine of the angle, B A C, 23^d 31′ 30″;	9,601135
So the Sine of A C 60^d,	9,937530
To the Sine of B C, 20^d 13′ 22″:	9,538665

CHAP. III.

Having the greateſt Declination of the Sunne, together with his Diſtance from the next Æquinoctiall *point, to finde his* Right Aſcenſion.

IN the Triangle A B C of the former Diagram, having (as before) the angle B A C, and the Hypothenuſe A C, the Right Aſcenſion of the Sunne A B, will be found to be 57^{d} 48′ 6″. for,

As the Radius, 90^{d},	10,000000
To the Tangent of A C 60^{d};	10,238560
So the Co-ſine of A, 23^{d} 31′ 30″,	9,962315
To the Tangent of A B, 57^{d} 48′ 6″:	10,200875

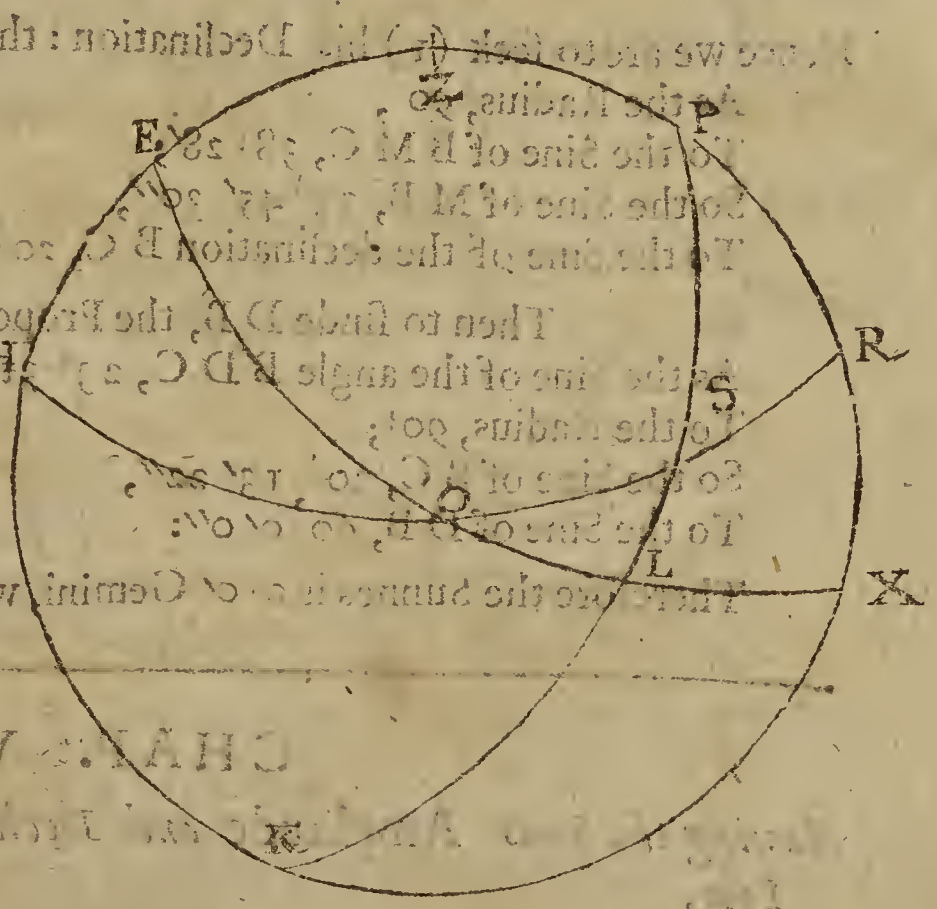
Or, as the Tangent of A 23^{d} 31′ 30″, to the Radius, So the Tangent of B C, 20^{d} 13′ 22″, to the Sine of A B, 57^{d} 48′ 6″

Or thus, As Co-ſine of B C, to Radius, So Co-ſine of A C, to Co-ſine of A B.

CHAP. IV.

Having the Elevation of the Pole, and Declination of the Sun, to finde his Amplitude.

IN the annexed Scheme.
EHKRP, is the Meridian.
H O R, the Horizon.
E O X, the Æquator.
P, the Pole of the Æquator.
L S, the Suns declination.
R O X, Complement of the Poles Elevation.
O S, the Suns Amplitude required.



Admit the Sunne be in the firſt point of Gemini, as before: wherefore in the Triangle S O L, having the angle O, 38^{d} 28′, and the ſide L S, 20^{d} 13′ 22″, we ſhall finde the Sunnes Amplitude O S, 33^{d} 45′ 30″. for,

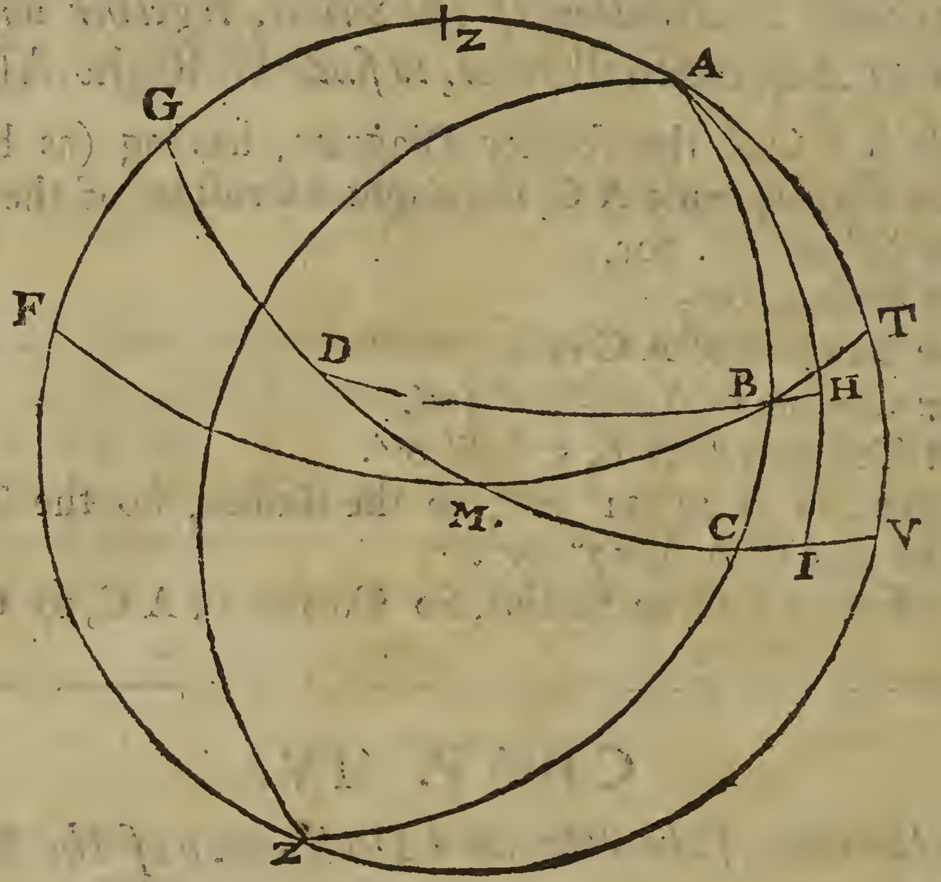
As the Sine of the angle S O L, 38^{d} 28′,	9,753831
To the Radius, 90^{d};	10,000000
So the Sine of L S 20^{d} 13′ 22″,	9,538665
To the Sine O S, 33^{d} 45′ 39″:	9,744834

CHAP. V.

Having the Amplitude *of the Sunne, and Elevation of the Pole, to finde the Sunnes Declination, and conſequently, his true place in the* Zodiaque.

IN the following Diagram, obſerve, that,
A G F A, is the Meridian.
F M T, the Horizon.
G D C M I V, the Æquator.
D B H, a part of the Zodiaque.
A, the Pole thereof,
D, the beginning of Aries.
H, the firſt point of Cancer.
H I, the greateſt declination of the Sunne.
V T, the Complement of the Poles Elevation.
B C, the declination of the Sunne.
A H I, the Solſtitiall Colure.
M B, the Sunnes Amplitude.
B, the Sunnes place.
D B, the Arch deſired.

In the Rectangle Triangle B C M, is known:
1 The angle B M C 38^{d} 28′.
2 The Hypothenuſe B M 33^{d} 45″ 30″.



Hence we are to ſeek (1) his Declination: thus,

As the Radius, 90^{d},	10,000000
To the Sine of B M C, 38^{d} 28′;	9,793831
So the Sine of M B, 33^{d} 45′ 30″,	9,744834
To the Sine of the declination B C, 20^{d} 13′ 22″:	9,538665

Then to finde D B, the Proportion is,

As the Sine of the angle B D C, 23^{d} 31′ 30″,	9,601135
To the Radius, 90^{d};	10,000000
So the Sine of B C, 20^{d} 13′ 22″,	9,538665
To the Sine of D B, 60^{d} 0′ 0″:	9,937530

Therefore the Sunnes is 0^{d} 0′ Gemini, which was required.

CHAP. VI.

Having the Suns Amplitude *and Declination, to finde the height of the Pole.*

IN the Triangle B C M of the former Diagram, I ſay,

As the Sine of the Suns Amplitude B M, 33^{d} 45′ 30″,	9,744834
To the Sine of the Suns declination B C, 20^{d} 13′ 22″;	9,538665
So the Radius, 90^{d},	10,000000
To the Sine of the angle, B M C, 38^{d} 28″	9,793831

The Complement whereof 51^{d} 32′, is the Elevation of the Pole deſired.

CHAP. VII.

Having the Amplitude *and Declination of the Sun, to finde the Aſcenſionall Difference.*

IN the Triangle B M C of the laſt premiſed Diagramme, M B is the Amplitude, B C the Declination, and M C the Aſcenſionall difference, which is required.

As the Co-ſine of the Suns declination B C 20^{d} 13′ 22″ 9,972368
To the Radius, 90_{d} 10,000000
So the Co-ſine of the Suns Amplitude M B 33_{d} 45′ 30″; 9,919804
To the Co-ſine of the Aſcenſionall Difference M C 27_{d} 37′ 28″ 9,947436

Or, having the Latitude of the Place, and Declination of the Sun, to finde the Aſcenſionall Difference.

As the Tang. of the Ang. CMB, the Compl. of the Poles Elevation, 38^{d} 28′, 9,900086
To the Radius 90^{d}; 10,000000
So the Tangent of B C, the Suns Declination 20_{d} 13′ 22″, 9,566295
To the Sine of M C the Aſcenſionall difference 27^{d} 37′ 28″: 9,666209

CHAP. VIII.

Having the Right Aſcenſion *and* Aſcenſionall Difference, *to finde the* Oblique Aſcenſion *and* Deſcenſion.

IN the former Diagram, D C repreſents the Right Aſcenſion, M C the Aſcenſionall difference, and D M the Oblique Aſcenſion, which is found by deducting the Aſcenſionall difference C M, from the Right Aſcenſion D C. For,

If the Declination be	North	Subſtract	The Aſcenſionall difference, to or from the Right Aſcenſion, and it will give	The Oblike	Aſcenſi.
		Adde			Deſcenſi.
	South	Adde	The Aſcenſionall difference, to or from the Right Aſcenſion, and it will give	The Oblike	Aſcenſi.
		Subſtract			Deſcenſi.

	D	′	″
Right Aſcenſion 0^{d} ♊	57	48	06
Aſcenſionall Difference	27	37	28
Oblique Aſcenſion 0^{d} ♊	30	10	38
Oblique Deſcenſion 0^{d} ♊.	85	25	34

CHAP. IX.

To finde the time of the Suns riſing, and ſetting, with the length of the Day and Night.

ACcording to the 7 Chap. aforegoing, finde the Aſcenſionall difference of the Sun, which, when the Sun is in the Northern Signes, is to be added to the Semi-diurnall Arch of the Right Sphære, which is 90^{d}. but is to be ſubſtracted from the ſame, if he be in the Southern Signes, and the Summe or difference will be the Semi-diurnall Arch, which doubled, is the Day Arch, whoſe Complement to 24 hours is the Night Arch, which bi-ſected, is the time of the Sunns riſing.

As when the Sun is in the firſt point of Gemini, his Aſcenſionall difference is found to be 27^{d} 37′ 28″, which I adde to the Quadrant, becauſe his declination is North, and the Aggregate will be the Semidiurnall Arch.

	D	′	″
The Quadrant or Semid. Arch of the Right Sphære,	90	0	0
Aſcenſionall difference adde,	27	37	28
The Semidiurnall Arch,	117	37	28
The Diurnall Arch.	235	14	56

The

The Diurnall Arch converted into time maketh $15^{h}\ 41'\ 0''$, for the length of the Day, whoſe Complement to 24^{ho} *viz.* $8^{ho}\ 19'\ 0''$, is the length of the Night, which bi-ſected giveth the time of the Sun riſing at $4^{h}\ 9'\ 30''$.

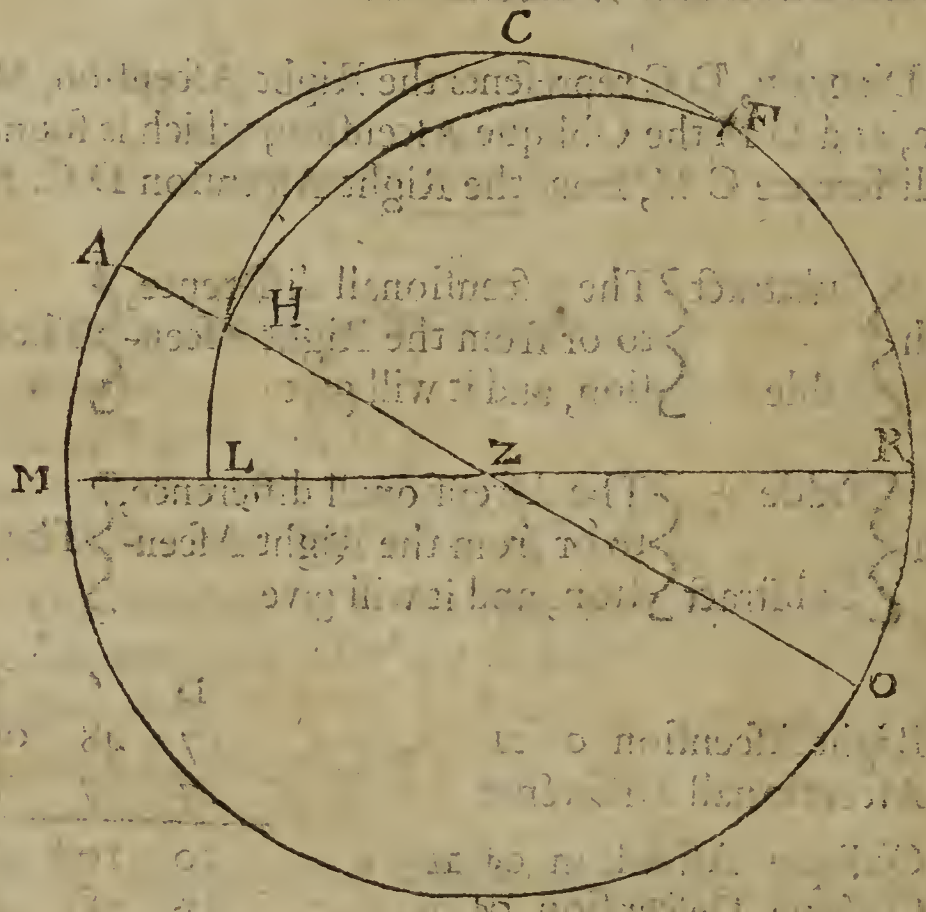
CHAH. X.

Having the Elevation of the Pole, and Declination of the Sun, to finde his Altitude at any time aſſigned.

In this Probleme, are three Varieteis.

1 If the Sunne be in the Æquator, that is in the beginning of Aries or Libra.

In this Diagram annexed, ſuppoſe the Sun at H, be two houres diſtant from the Meridian A, or 30^{d}, and the Elevation of the Pole R F be $51^{d}\ 32'$ equall to A C, the angle at A, being right: therefore,



As the Radius, 90_{d},	10, 000000
To the Co-ſine A H, 30_{d};	9,937530
So the Co-ſine A C, $51_{d}\ 32'$,	9,793832
To the Co-ſine C H, $57^{d}\ 24'\ 13''$:	9,731362

Whoſe Complement $32^{d}\ 35'\ 47''$ is the ſide L H, which is the true altitude of the Sunne above the Horizon.

2 If the Sun be in the Northern Signes, ♈, ♉, ♊, ♋, ♌, ♍.

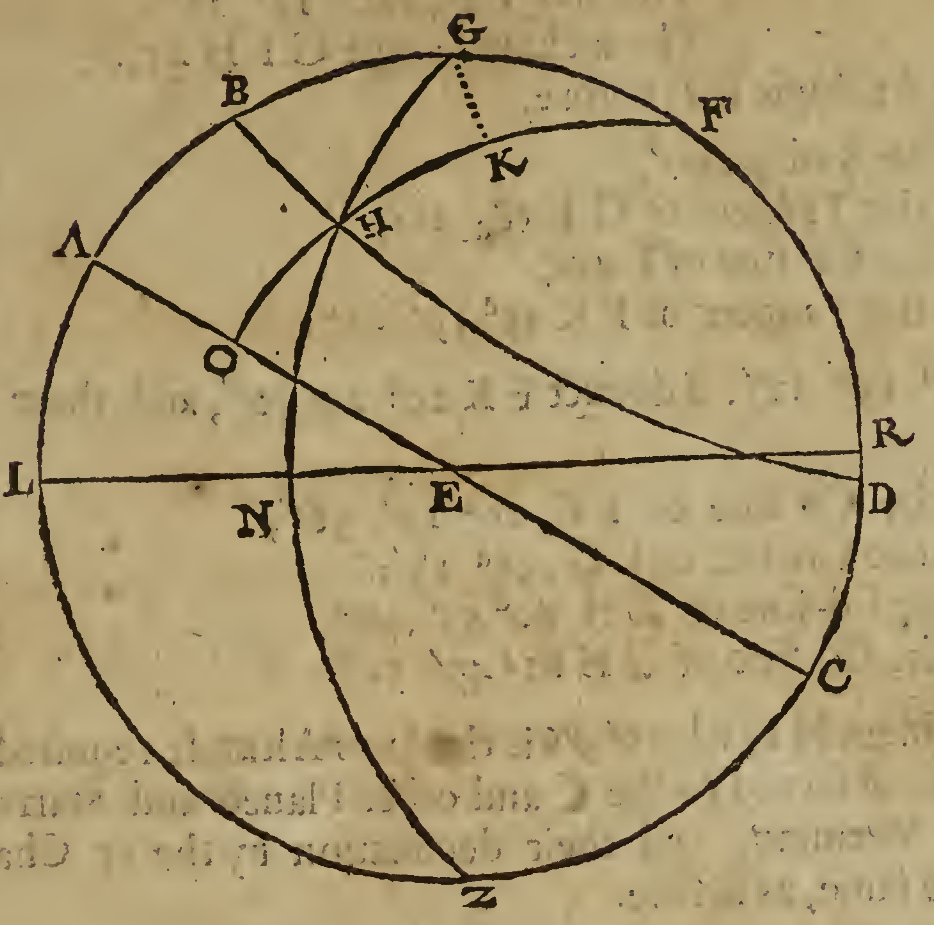
In the Diagram annexed.

A E C repreſents the Æquinoctiall.
F, the Pole of the Æquinoctiall.
L E R, the Horizon.
G, the Pole of the Horizon.
B D, a parallel of the ☉ declination.
F O, the Meridian of the ☉.
B H, the diſtance of the ☉ from the Meridian.
H O, the declination of the ☉ North.
R F, the altitude of Pole.
F G, the Complement.

Admit the Sun at H, be diſtant from the Meridian B 45^{d} and be then in 0 Gemini, where his declination O H is $20^{d}\ 13'\ 22''$, which being taken out of the Quadrant F O, 90^{d}, there remains F H $69^{d}\ 46'\ 38''$, which known, we have in the Triangle F G H theſe three parts.

1 The ſide F G $38^{d}\ 28'\ 0''$.
2 The ſide F H 69 46 38.
3 The included angle G F H 45^{d}.

Then



Then I ſay,

1	As the Radius 90 deg.	10,000000
	To the Tangent F G, $38^{d}\ 28'$	9,900086
	So the Co-ſine of the angle F 45^{d},	9,849485
	To the Tangent of F K, $29^{d}\ 19'\ 36''$.	9,749571

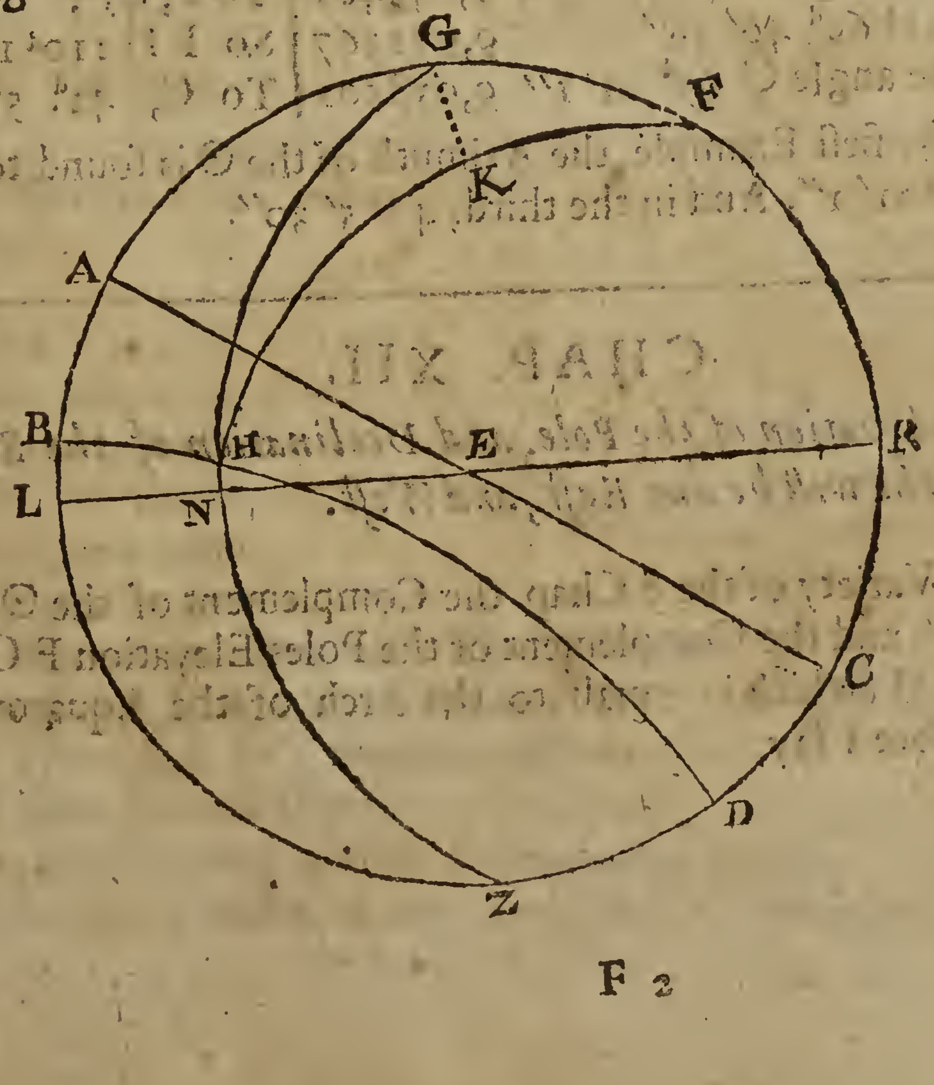
Then from F H $69^{d}\ 46'\ 38''$, I deduct FK $29^{p}\ 19'\ 36''$ and there remains K H $40^{d}\ 27'\ 2''$. then I ſay again:

2	As the Co-ſine of F K $29^{d}\ 19'\ 36''$	9,940437
	To the Co-ſine of F G $38^{d}\ 28'$,	9,893745
	So the Co-ſine of K H $40^{d}\ 27'\ 2''$,	9,881365
	To the Co-ſine of G H $46^{d}\ 53'\ 25''$.	9,834673

The Complement whereof N H $43^{d}\ 6'\ 35''$ is the altitude of the Sun above the Horizon.

3 If the Sun be in the Southern Signes ♎, ♏, ♐, ♑, ♒, ♓.

Suppoſe the Sun in the Winter ſeaſon be in the oppoſite point to the former, *viz.* in o ♐, having on the contrary 20^{d}, $13'\ 22''$ South Declination, and be alſo 45^{d} diſtant from the Meridian, as before, therefore in the Oblique angled Triangle F G H of the annexed Diagram we have given.



11.155356
9.900086
11.055442

1 The Side F G 38^{d} 28′.
2 The Side F H, 110^{d} 13′ 22″.
3 The included angle G F H 45^{d}.

Then the Analogie is as before,

1	As the Radius, 90^{d},	10,000000
	To the Tangent of G F 38^{d} 28′;	9,900086
	So the Co-ſine of F 45^{d},	9,849485
	To the Tangent of F K 29^{d} 19′ 36″:	9,749571

From F H 110^{d} 13′ 22″, I deduct F K 29^{d} 19′ 36″, and there reſts K H 80^{d} 53′ 46″. then.

2	As the Co-ſine of F K, 29^{d} 19′ 36″,	9,940437
	To the Oo-ſine of F G, 38^{d} 28′;	9,893745
	So the Co-ſine of K H 80^{d} 53′ 46″,	9,199275
	To the Co-ſine of G H 81^{d} 49′ 51″:	9,152583

Whoſe complement H N 8^{d} 10′ 9″ is the Suns Altitude required.

The like is to be obſerved of the ☾ and other Planets and Starrs, for having their diſtance from the Meridian, and their declination by the 13 Chap. following, the Worke will be the ſame, as before.

CHAP. XI.

Having the Altitude of the Sun, his Diſtance from the Meridian, and Declination, to find his Azimuth.

THe Azimuth, or Latitude of the ⊙ from the Meridian, is an Arch of the Horizon intercepted between the Meridian, and the verticall line paſſing by the ⊙, being underſtood in the former Schemes by the angle L G N, or Arch L N.

In the firſt Diagram of the laſt Chap. I ſay,

As the Sine of G H 57^{d} 24′ 13″,	9,925563
To the Sine of the angle F 30^{d};	9,698970
So the Sine of F H 90^{d},	10,000000
To the Sine of the angle G 36^{d} 24′ 17″:	9,773407

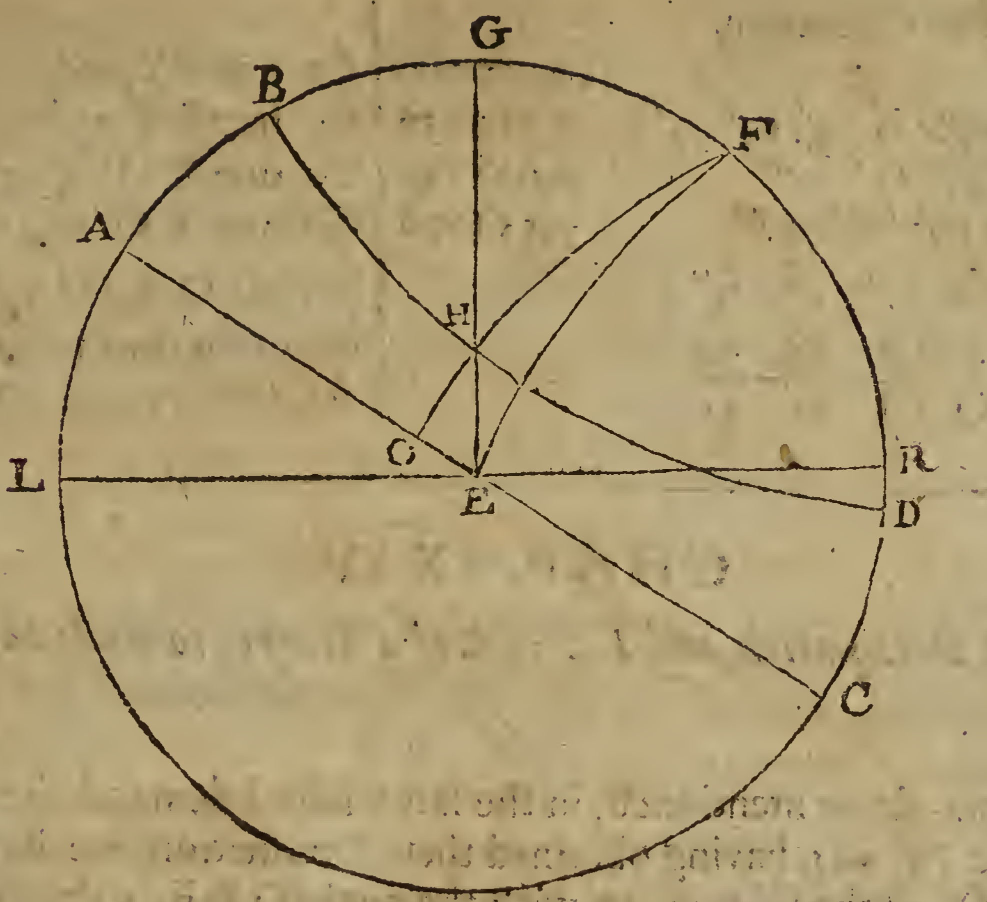
In the ſecond Diagram.		In the third Diagram.	
As the Sine of G H 46^{d} 53′ 25″,	9,863350	As G H 81^{d} 49′ 51″,	9,995570
To the Sine of the angle F 45^{d};	9,849485	To F, 45^{d};	9,849485
So the Sine of F H 69^{d} 46′ 38″	9,972367	So F H 110^{d} 13′ 22″	9,972367
To the Sine of the angle G 65^{d} 21′ 1″	9,958502	To C, 42^{d} 5′ 30″	9,826282

Therefore in the firſt Example, the Azimuth of the ⊙ is found to be 36^{d} 24′ 17″. In the ſecond, 65^{d} 21′ 1″. And in the third, 42^{d} 5′ 30″.

CHAP. XII.

Having the Elevation of the Pole, and Declination of the Sun, to finde the time when he will be due Eaſt, and Weſt.

IN the ſecond Variety of the 9 Chap. the Complement of the ⊙ Declination F H is 69^{d} 46′ 38″, and the Complement of the Poles Elevation F G 38^{d} 28′. Hence, the angle G F H (which is equall to the Arch of the Equator A O) is to be ſought, therefore I ſay,



As the Tangent of F H, 69^{d} 46′ 38″,	10,433794
To the Radius, 90^{d};	10,000000
So the Tangent of F G, 38^{d} 28′,	9,900086
To the Co-ſiine of the angle F, 72^{d} 58′ 56″:	9,466382

Whoſe Complement O F E 17^{d} 1′ 4″ being converted into time, giveth 1^{h} 8′ 4″, and ſo long is it after 6 in the morning when the ☉ will be due Eaſt, and before 6 at night, when he will be due Weſt.

CHAP. XIII.

Having the Longitude and Latitude of a Starre, to finde its Declination.

IN the adjunct Scheme, let E B T D, repreſent the Solſtitiall Colures.

AÆ C, the Æquator.

DÆ B, the Signifier.

F and P, the Poles of the Æquator.

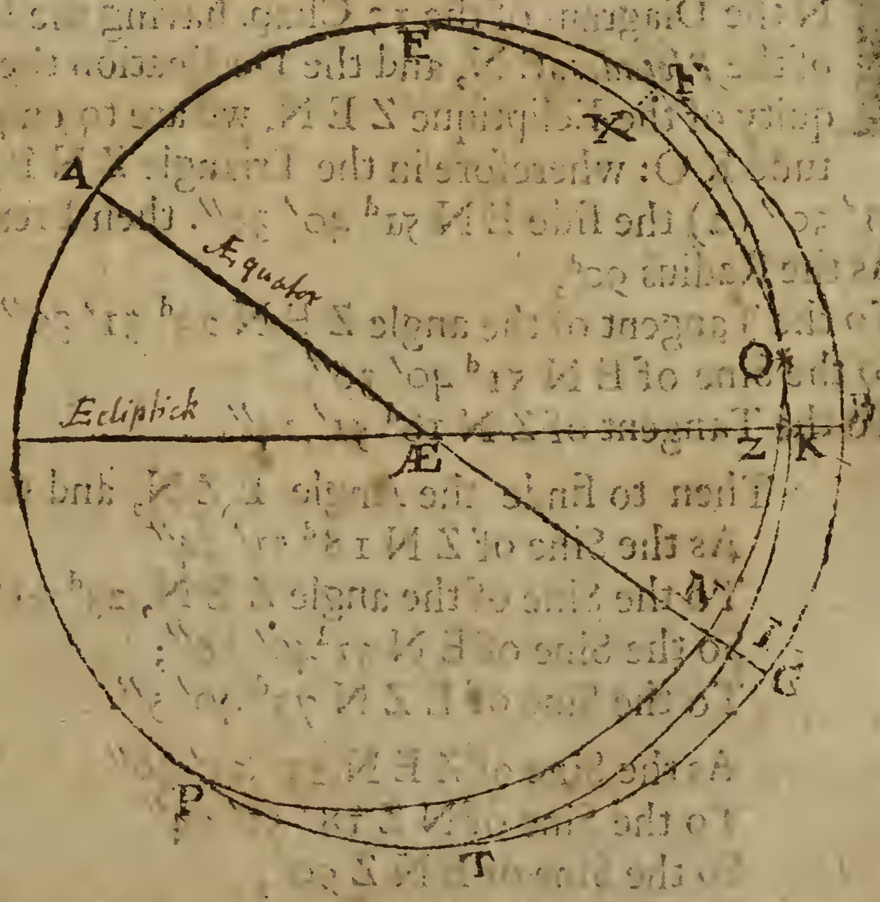
E and T, the Poles of the Signifier.

O, the Place of the Starre.

E K, the Longitude.

K O, the Latitude.

O N, the Declination,



The firſt of Ianuarie this Year 1650. the Declination of the *Pleiades* is required, at which time the Longitude of the middle and brighteſt of them is 25^{d} 5′ 35″ Taurus, and the Latitude 4^{d} North, the Declination of the Sun being fixed *viz.* 23^{d} 31′ 30″, wherefore, by the interſection of three great Circles, we have limited the Oblique angled Triangle E F O, wherein is given:

1 The ſide F F, the Suus greateſt Oliquity 23^{d} 31′ 30″.
2 The ſide E O, the Complement of their Latitude North 86^{d}.
3 The ang. F E O, the Complement of their Longitude to the Quadrant 34^{d} 54′ 25″

11.155356
9913856
11.069212

85. 8

I. The Operation.

Radius 90^d	10,000000
Co-ſine of the angle E $34^d\ 54'\ 25''$;	9,913856
Tangent of E F $23^d\ 31'\ 30''$	9,638820
Tangent of E X. $19^d\ 38'\ 49''$	9,552676

From	E O	86^d	$0'$	$0''$
Subſtr.	E X	19	38	49
Reſts	X O	66	21	11

II

Co-ſine EX, $19^d\ 38'\ 49''$	9,973950
Co-ſine E F $23^d\ 31'\ 30''$	9,962315
Co-ſine X O $66^d\ 21'\ 11''$	9,603252
Co-ſine F O $67^d\ 0'\ 52''$	9,591617

Whoſe ON, $22^d\ 59'\ 8''$ is the Declination of the brighteſt of the *Pleiades*, that was ſought for.

As the Radius
To Sine of the Longitude
So Tang of Declinatio Maxima
To a fourth Ark.
Then 4th Ark
As Cosine fourth Ark
To Cosine of 23 28
So Cosine of fifth Ark

CHAP. XIV.

Having the Declination and Latitude of a Starre, to finde the Right Aſcenſion.

Subtract 4th from the Complement of Latitude of Star. There Remains a fifth Ark

AT the time above mentioned, in the laſt Chap. I demand the Right Aſcenſion of the *Pleiades*, having obtained their Declination, we have in the Triangle E F O, all the ſides given, with the angle O E F, therefore to finde the angle F, the Analogie is,

Complem. Declinatio	As the Sine of F O $67^d\ 0'\ 52''$	9,964072
Complem Long.	To the Sine of of the angle E $34^d\ 54'\ 28''$;	9,757591
Complem Lat.	So the Sine of E O $86^d\ 0'$	9,998941
	To the Sine of the Compl. of the ang. F, $38^d\ 19'\ 24''$.	9,792460

Which angle F $38^d\ 19'\ 24''$ is equall to the arch C N, whoſe Complement E N $51^d\ 40'\ 36''$ is the Right Aſcenſion of the middle and brighteſt Starre of the *Pleiades.*

CHAP. XV.

Having the Declination and Right Aſcenſion of a Starre, to finde the Longitude and Latitude thereof.

IN the Diagram of the 13 Chap. having the Right Aſcenſion of the bright Sarre of the ***Pleiades***, E N, and the Declination thereof N O, with the greateſt Obliquity of the Ecliptique Z E N, we are to enquire its Longitude E K, and Latitude K O: wherefore in the Triangle Z N E, we have (1) the angle Z E N $23^d\ 31'\ 30''$ (2) the ſide E N $51^d\ 40'\ 36''$. then I reaſon,

As the Radius 90^d,	10,000000
To the Tangent of the angle Z E N $23^d\ 31'\ 30''$	9,638820
So the Sine of E N $51^d\ 40'\ 36''$	9,894607
To the Tangent of Z N $18^d\ 51'\ 24''$.	9,533427

From Declination			
No.	22^d	$59'$	$8''$
Taking N. Z	18	51	24
Reſte Z O	4	7	44

Then to finde the Angle E Z N, and the ſide E Z, the Analogie is,

As the Sine of Z N $18^d\ 51'\ 24''$	9,509473
To the Sine of the angle Z E N, $23^d\ 31'\ 30''$;	9,601135
So the Sine of E N $51^d\ 40'\ 36''$;	9,894607
To the Sine of E Z N $75^d\ 40'\ 5''$.	9,986269

As the Sine of Z E N $23^d\ 31'\ 30''$	9,601135
To the Sine of N Z $18^d\ 51'\ 24''$	9,509473
So the Sine of E N Z 90^d,	10,000000
To E Z $54^d\ 4'\ 9''$.	9,908338

Which angle E Z N is equall to the angle O Z K.

Then to finde the Latitude O K, I ſay,

As the Sine of O K Z 90^d,	10,000000
To the Sine of Z O $4^d\ 7'\ 44''$	8,857334
So the Sine of O Z K $75^d\ 40'\ 5''$,	9,986269
To the Sine of the Latitude O K $4^d\ 0'\ 0''$	8,843603

Laſtly, to finde the Arch Z K, and conſequently, the Longitude E K.

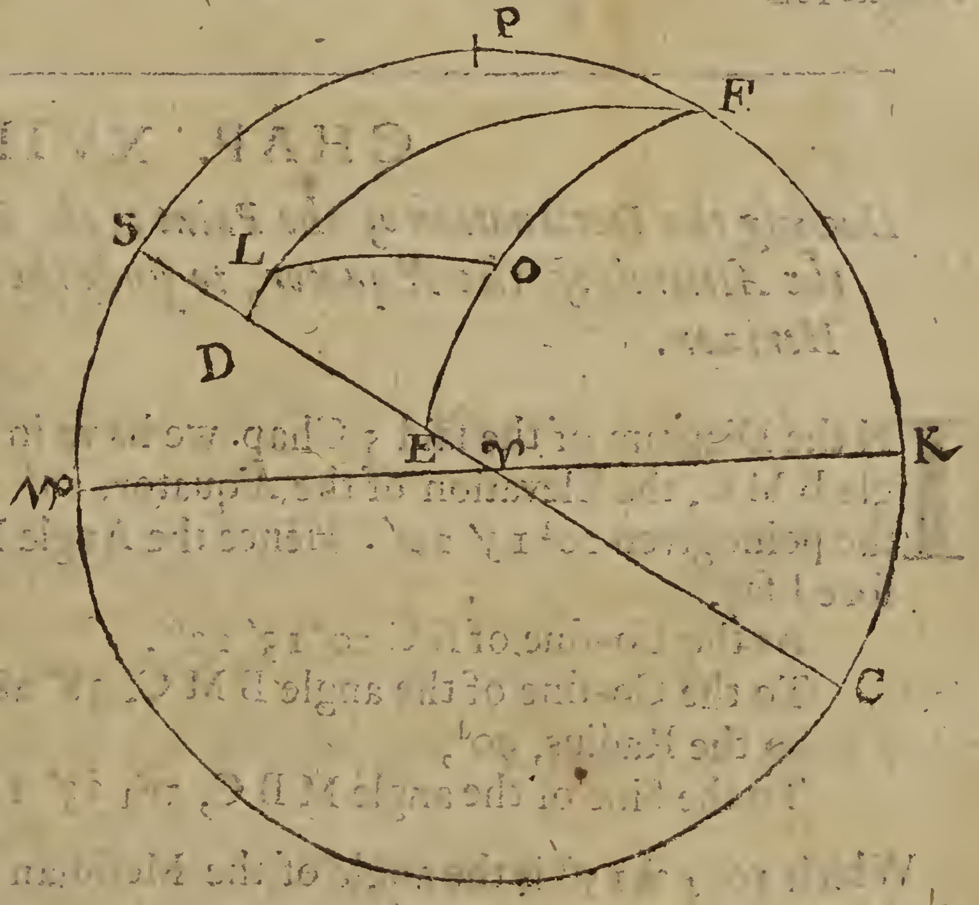
As the Tangent of the angle K Z O $75^{d}\ 40'\ 5''$,	10,592625
To the Radius 90^{d};	10,000000
So the Tangent O K $4^{d}\ 0'$,	8,844644
To the Sine of Z K $1^{d}\ 1'\ 26''$:	8,252019

Which being added to E Z $54^{d}\ 4'\ 9''$, giveth E K $55^{d}\ 5'\ 35''$, which is the true Longitude of the middle and brighteſt Starre of the *Pleiades* from the Vernall Æquinox E, at the time given.

CHAP. XVI.

Having the Meridian Altitude of an unknown Starre, and the Diſtance thereof from a known Starre, to finde the Longitude and Latitude of the unknown Starre.

ABout the end of the Year 1577. *Tycho* obſerved the Diſtance of the little Star, in the Breaſt of *Pegaſus* from the bright Starre of the *Vultur* to be exactly $45^{d}\ 31'$, and by the Meridian altitude thereof, he found the Declination to be $22^{d}\ 26'$ North, which given, the Longitude of the ſaid Starre is to be enquired, therefore in the Oblique angled Triangle (of the annexed Diagram) F O L is known.



1 F L the Complement of the declination of the bright ✳ of the *Vultur* $82^{d}\ 8'$.

2 F O, the Complement of the declination of the ✳ in the breaſt of *Pegaſus* $67^{d}\ 34'$

3 O L, the diſtance of them $45^{d}\ 31'$.

Hence, the angle at F (which is the difference of their Right Aſcenſions) will be found to be $44^{d}\ 54'\ 33''$, as I ſhall here demonſtrate.

Sine of F L	82 8′	9,995893
Sine of F O	67 34	9,965824
Difference	14 34	
I Summe		19,961717
I I Quadrat of the R.		20,000000

Baſe L O	45^{d}	31′		
Difference of F L and F O	14	34		
Summe	60	5		
Difference	30	57		
½ of the Summe	30	2	30	9,699516
½ of the Difference	15	28	30	9,426215
I I I Summe				19,125731

30. 2′ 48″
72 30 4
7. 32 44

I Summe	19,961717
I I Qadrat of the Radius.	20,000000
I I I Summe.	19,125731
I I I I Quadrat of the Sine of half the angle ſought	19,164014
Which Bi-ſected, giveth $22^{d}\ 27'\ 17''$.	9,582007

Whoſe double $44^{d}\ 54'\ 34''$ is the angle L F O, which is equall to the Arch D E, the difference of their Right Aſcenſions, which Arch I adde to the Right Aſcenſion of the bright ✳ of the Vultur $292^{d}\ 35'$ and the Summe $337^{d}\ 29'\ 34''$ is the Right Aſcenſion of the little Starre in the breſt of *Pegaſus*.

Then having the Declination of this Starre 22^{d} 26′ North, and the Right Aſcenſion 337^{d} 29′ 34″ the Longitude of the ſaid Starre, by the 15 Chap. will be found to be 18^{d} 36′ ♓, and the Latitude thereof 29^{d} 24′ North.

CHAP. XVII.

Having the greateſt obliquity of the Ecliptique, together with the diſtance of the point given from the Æquinoctiall, to finde the Angle of the Interſection of the Ecliptique with the Meridian.

IN the Diagramme of the 5 Chap. we have known in the Triangle D C B.

1 The angle D, the greateſt Declination of the ☉ 23^{d} 31′ 30″.
2 D B, the Diſtance of ☉ from the beginning of ♈. *viz.* 60^{d} 0′.
3 The Angle C 90^{d}.

Then the Analogie is,

As the Radius 90^{d},	10,000000
To the Tangent of the angle B D C 23^{d} 31′ 30″;	9,638820
So the Co-ſine of D B 60^{d},	9,698970
To the Co-tangent of the angle D B C 77^{d} 43′ 13″.	9,337790

Which 77^{d} 43′ 13″ is the angle of the Ecliptique with the Meridian, that was ſought for.

CHAP. XVIII.

Having the Declination of the Point of the Ecliptique given, together with the Altitude of the Æquator, to finde the angle of the Meridian, with the Horizon.

IN the Diagram of the ſaid 5 Chap. we have in the Triangle B C M, (1) the angle B M C, the Elevation of the Æquator, 38^{d} 28′ (2) B C the Declination of the point given 20^{d} 13′ 22″. Hence the Angle M B C is to be enquired. Therefore I ſay,

As the Co-ſine of B C 20^{d} 13′ 22″,	9,972367
To the Co-ſine of the angle B M C, 38^{d} 28′;	9,893745
So the Radius, 90^{d},	10,000000
To the Sine of the angle M B C, 56^{d} 33′ 15″.	9,921378

Which 56^{d} 33′ 15″ is the angle of the Meridian (or Circle of Declination) with the Horizon, that was required.

CHAP. XIX.

To finde the angle Orient, or Altitude of the 90^{d} of the Ecliptique, and conſequently the Points aſcending and deſcending.

FIrſt, we are to enquire what Signe and degree is in the *Medium Cœli*.

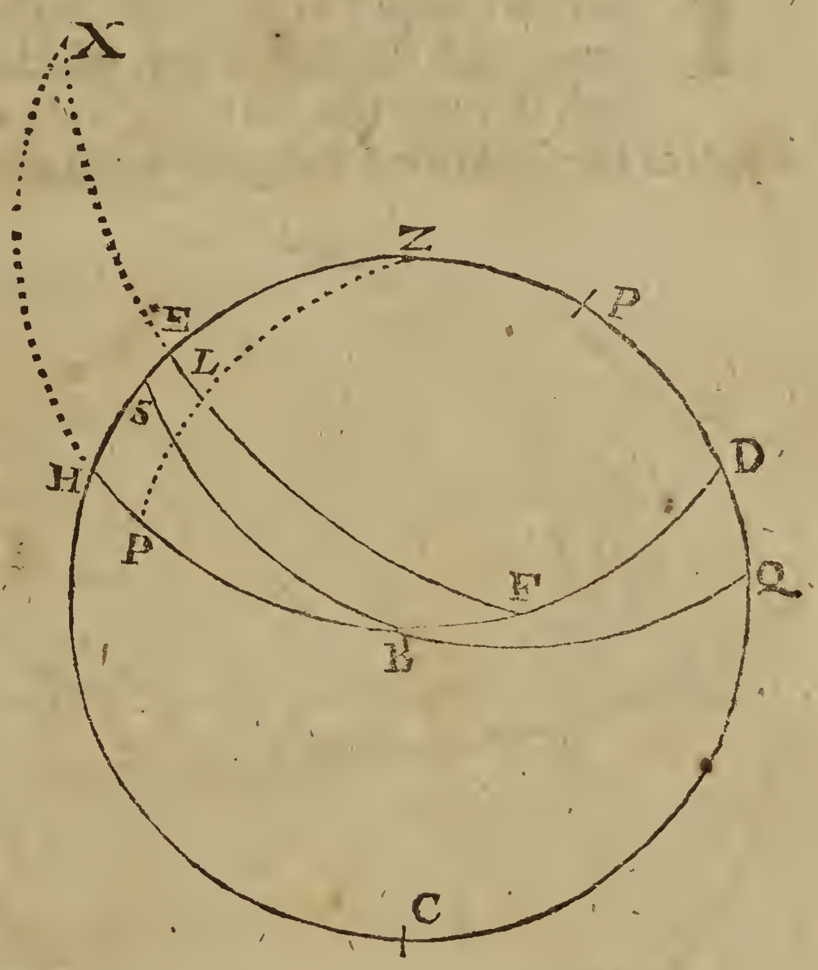
Admit the Sun be in 0 ♊, diſtant from the Meridian 3^{ho} or 45^{d} *Ad Ortum.*

	D	′	″
Right Aſcenſion ☉ in 0 ♊ by the 3 Chap.	57	48	6
Diſtance of the ☉ from the Meridian, Subſtract.	45	0	0
Right Aſcenſion of the *Medium Cœli.*	12	48	6

Hence, the Point culminating is 13^{d} 55′ 8″ Aries, for in the Diagram of the 5 Chap. in the Triangle B C D, I ſay,

As the Radius, 90^{d};	10,000000
To the Co-tangent D C, 12^{d} 48′ 6″;	10,643544
So the Co-ſine of the angle B D C, 23^{d} 31′ 30″,	9,962315
To the Co-tangent of D B 13^{d} 55′ 8″:	10,605859

That is the 13^{d} 55′ 8″ Aries, which is the Point Culminating, the Declination whereof, according to the 2 Chap. is 5^{d} 30′ 35″ North, which taken out of the Elevation of the Pole 51^{d} 32′, leaveth 46^{d} 1′ 25″, which is the diſtance of the Point culminating from the Zenith, then according to the 17 Chap. the angle of the point culminating with the Meridian is found to be 67^{d} 5′ 37″.



Then, in the annexed Diagram, obſerve that Z H C D Z repreſents the Meridian:
S B Q, the Æquator.
P, the Pole of the Æquator.
H B D, the Horizon.
Z, the Zenith, or Pole of the Horizon.
E, the Point Culminating.
L P, the 90 or greateſt altitude of the Ecliptique.
F E X, a Semi-circle of the Ecliptique.
F, the Point Aſcending.
X, the Point deſcending.
P F L, the angle Orient.
P X L, the angle Occident.

Theſe things premiſed, we have in the Right angled Triangle Z L E, (1) the ſide Z E, the diſtance of the Point Culminating from the Zenith, 46^{d} 1′ 25″. (2) the angle Z E L, the angle of the Point Culminating with the Meridian, 67^{d} 5′ 37″. Hence the ſide Z L is required. therefore,

As the Radius, 90^{d},	10,000000
To the Sine of the angle Z E L, 67^{d} 5′ 37″;	9,964327
So the Sine of Z E 46^{d} 1′ 25″	9,857107
To the Sine of Z L 41^{d} 31′ 11″	9,821434

Whoſe Complement P L 48^{d} 28′ 49″, is the Altitude of the 90^{d} or angle at F, or X.

Then in the Triangle, X E H, is known.
1 The angle X 48^{d} 28′ 49″.
2 E H, 43^{d} 58′ 35″.
3 The angle X H E, 90^{d}.
Then to finde the ſide X E, the Analogie is,

As the Sine of the Angle E X H, 48^{d} 28′ 49″,	9,874324
To the Sine of E H 43^{d} 58′ 25″;	9,841585
So the Sine of the angle Z H E, 90^{d},	10,000000
To the Sine of X E, 68^{d} 1′ 52″	9,967261

The point of the Ecliptique culminating at E, is before found to be 13^{d} 55′ 8″ ♈, from which deducting X E, 68^{d} 1′ 52″ or two Signes 8 1′ 52″, there remaineth the point of the Ecliptique Deſcending at X, 5^{d} 53′ 16″ ♒, whoſe oppoſite point 5^{d} 53′ 16″ ♌, is the point of the Ecliptique Aſcending at the ſame inſtant at F.

Or thus, which is all one.

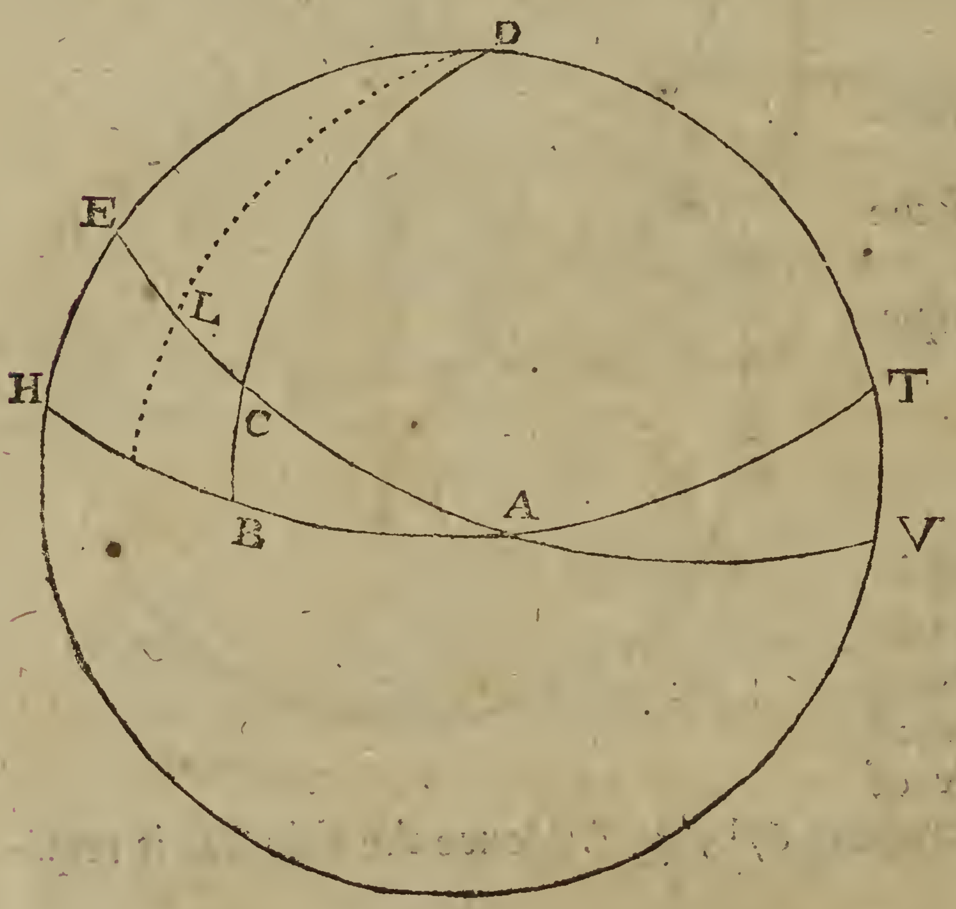
As the Co-ſine of Z Z 42^{d} 31′ 11″,	9,874324
To the Radius 90^{d};	10,000000
So the Co-ſine of Z E, 46^{d} 1′ 25″,	9,841585
To the Co-ſine of E L 21^{d} 58′ 8″	9,967261

Which added to the *Medium Cœli* ♈ $13^{d}\,55'\,8''$, maketh the 90^{d} ♉ $5^{d}\,53'\,16''$, to which adding three Signes, giveth the Aſcendant $5^{d}\,53'\,16''$ ♌, as before.

CHAP. XX.

To finde the Parallacticall Angle, or Angle of the Ecliptique with the Verticall Circle.

THe angle of the Ecliptique with the Verticall circle (which I call the Parallacticall angle) is an Angle made by the Oblique cutting of the circle of altitude with the Ecliptique, which is right, or 90^{d}, when the ſaid circle paſſeth through the 90^{d} of the Ecliptique, but falling without the ſame its Oblique, as the folllowing Diagram demonſtrates, where,



D, denotes the Zenith.
D C B, the Verticall Circle.
D E H V T D, the Meridian.
T A B H, the Horizon.
V A E, a Semi-circle of the Ecliptique.
C, the angle of the interſection of the Ecliptique with the Verticall, which afterwards we call the Parallacticall Angle.

In the foregoing Chap. is ſhewed how to finde the Point of the Ecliptique Aſcending at any moment, in any Region whatſoever, and how to finde the diſtance of any point of the Ecliptique from the ſame, which being obtained, with the Altitude of the ſame point above the Horizon, as is taught in the 10 Chap. we may come ſpeedily to find the Parallacticall angle.

Admit the Sun at C, be in the firſt point of Gemini diſtant from the Meridian 45^{d} *Ad Ortum*, as before, at which time the Suns Altitude is found by the 10 Chap. to be $43^{d}\,6'\,35''$, and the point Aſcending by the 19 Chap. is $5^{d}\,53'\,16''$ Leo, from which point the Sun is diſtant $65^{d}\,53'\,16''$ which known we have in the Triangle A B C, in the former Diagram. (1) A C $65^{d}\,53'\,16''$. (2) B C $43^{d}\,6'\,35''$, then to finde the angle A C B, the proportion is,

Tangent of A C, $65^{d}\,53'\,16''$,	10,349131
Radius 90^{d};	10,000000
Tangent of B C $43^{d}\,6'\,35''$,	9,971323
Co-ſine of the angle B C A $65^{d}\,13'\,47''$:	9,622192

Or in the Triangle D L C.

Tangent of D C $46^{d}\,53'\,25''$,	10,028676
Radius 90^{d};	10,000000
Tangent of C L $24^{d}\,6'\,44''$,	9,650868
Co-ſine of the angle L C D $65^{d}\,13'\,47''$:	9,622191

Therefore the Parallacticall angle is $65^{d}\,13'\,47''$; there be other ways to finde the ſaid angle, but more difficult, which for brevity ſake, I paſſe by.

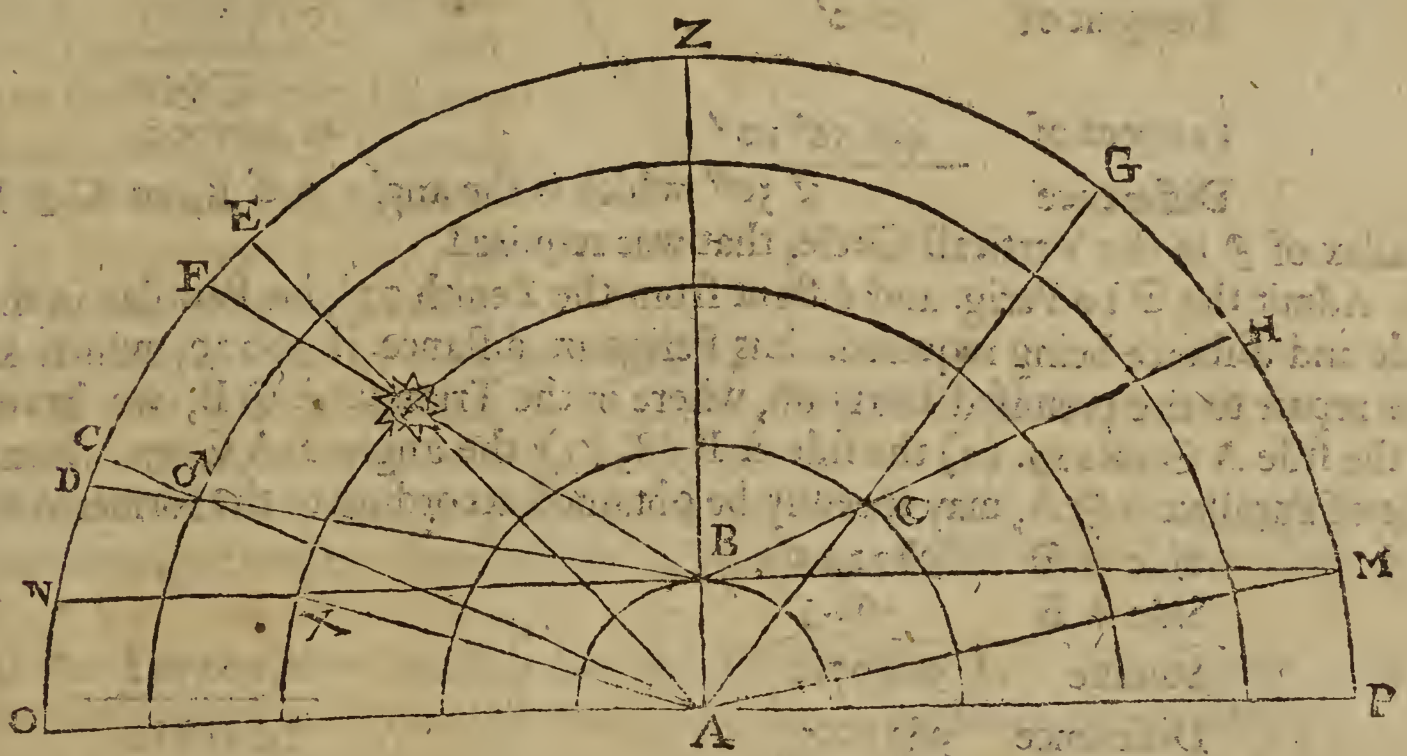
CHAP. XXI.

Of the Parallax of the Sun, Moon, and Starres.

THe true place of a Starre is a point of the Firmament ſhewed by a right line drawn from the Center of the Earth through the Center of the Starre, but the Viſible or apparent place is determined by a line drawn from the eye, through the Center of the Starre.

Therefore the Parallax of a Starre, is an Arch of a great Circle paſſing by the Zenith, and the true place of a Starre, namely, the Arch of the ſame Circle intercepted between the true and apparent Place.

A Scheme ſhewing what the Parallax, or Diverſity of Aſpect is.



In this Figure, A denotes the Center of the Earth.
B, the Place of the Superficies of the Earth from whence the Starre is ſeen.
♂ ☉ ☾, Their places in their Orbes.
A ♂ C, A ☉ E, A ☾ G, the lines of their true places.
B ♂ D, B ☉ F, and B ☾ H, The lines of their apparent places.

Hence, the angle made by the interſection of the ſaid two lines through the body of the Planet is the angle of Parallax, that is to ſay, in ♂ the angle A ♂ B, which (according to the 15 of the 1 of Elements) is equall to the angle C ♂ D. In the ☉ the angle of Parallax, is the angle A ☉ B. And laſtly, in the Moon it is the angle A ☾ B, or G ☾ H, which is all one.

By this it is manifeſt, that the neerer a Starre is to the Horizon and Center of the Earth, the greater is the Parallax, and hence it is, that the Orbite of the Moon being neereſt to the Earth, her Parallax is greateſt and moſt perceptable, becauſe the Semidiameter of the Earth beares a ſenſible proportion to the Semidiameter of the Moones Orbite, though it be very little, or nothing at all in compariſon of the Orbes of ♄ ♃ and the fixed Starres, which is cauſed by the Intervall, and vaſt diſtance which is between them, for the Semidiameter of the Earth according to the Proportion of my numbers is exactly $68\frac{1}{3}$, which is its true Proportion to the Semidiameters of all the planetary Orbes.

CHAP. XXII.

To finde the Parallax of the Sun, Moon, and other Planets in the Verticall Circle, or Circle of Altitude.

IN the 10 Chap of this Book I have ſhewed how to obtain the true Altitude of the ☉, ☾ and Planets above the Horizon, and in the following Book have ſhewed likewiſe how to get their Diſtance from the Center of the Earth, at any time aſſigned, its therefore requiſite I here ſhew how to finde their Parallax, or diverſity of Aſpect, which I ſhall demonſtrate both in Altitude, Longitude and Latitude; and firſt of the firſt, of which, for illuſtration, I ſhall ſet down three Examples.

1 The Altitude of ♂ above the Horizon, being 10^{d}, and his diſtance from the Earth 60500, I demand his Parallax in that Altitude and diſtance. In the former Diagram, ſuppoſe K X ♂ T be the Orbe of ♂, wherein from X to ♂, I number the diſtance of ♂ from the Zenith X, 80^{d}, which done, we have in the Triangle A ♂ B, (1) the ſide A ♂ 60500. (2) the ſide A B $68\frac{1}{2}$. (3) the angle ♂ A B 80. Hence, the angle A ♂ B, (which is equall to the Angle C ♂ D, will be $3' 50''$.

Side A ♂	60500.0	
Side A B	68.5	
Summe	60568.6	5,782247
Difference	60431.5	5,781263
Tangent of	$50^{d} 0'$	10,076186
		15,857449
Tangent of	$49^{d} 56' 10''$	10,075202

Difference $3' 50''$ which is the angle A ♂ B, or C ♂ D, the Parallax of ♂ in the Verticall Circle, that was required.

2 Admit the ☉ be Perig. and diſtant from the Zenith 77^{d}, his Parallax in that Altitude and diſtance being required. His Perigæan diſtance is 98229, which known, let us repair to the premiſed Diagram, where in the Triangle A ☉ B, we have given (1) the ſide A ☉ 98229. (2) the ſide A B $68\frac{1}{2}$ (3) the angle B A ☉ 77. Hence, the angle of Parallax B ☉ A, may ſpeedily be obtained, according to the former Analogie.

Side A ☉	98229.0	
Side A B	68.5	
Summe	98297.5	5,992542
Difference	98160.5	5,991937
Tangent	$51^{d} 30' 0''$	10,099395
	Ag.	10,091332
Tangent	51 27 40	10,098790

Whoſe Difference 2 20 is the Parallax of the ☉ required.

Let us ſuppoſe the ☾ be Perig. and Diſtant from the Zenith 45^{d}. Her Perigæan Diſtance A ☾ is 3873, which known, the Praxis is the ſame as before, for in the Triangle A ☾ B, we have A ☾ 3873. A B $68\frac{1}{2}$ with the included angle B A ☾ $45^{d} 0'$. Therefore,

As the Summe of the Sides A ☾ A B 3941.5,	4,595661
To the Difference 3804.5	4,580297
So the Tangent of $67^{d} 30' 0''$	10,382776
To the Tangent of $66^{d} 46' 28''$	10,367412

Reſts angle B ☾ A $43' 32''$, which is equall to the angle G ☾ H, the Parallax of the ☾ deſired.

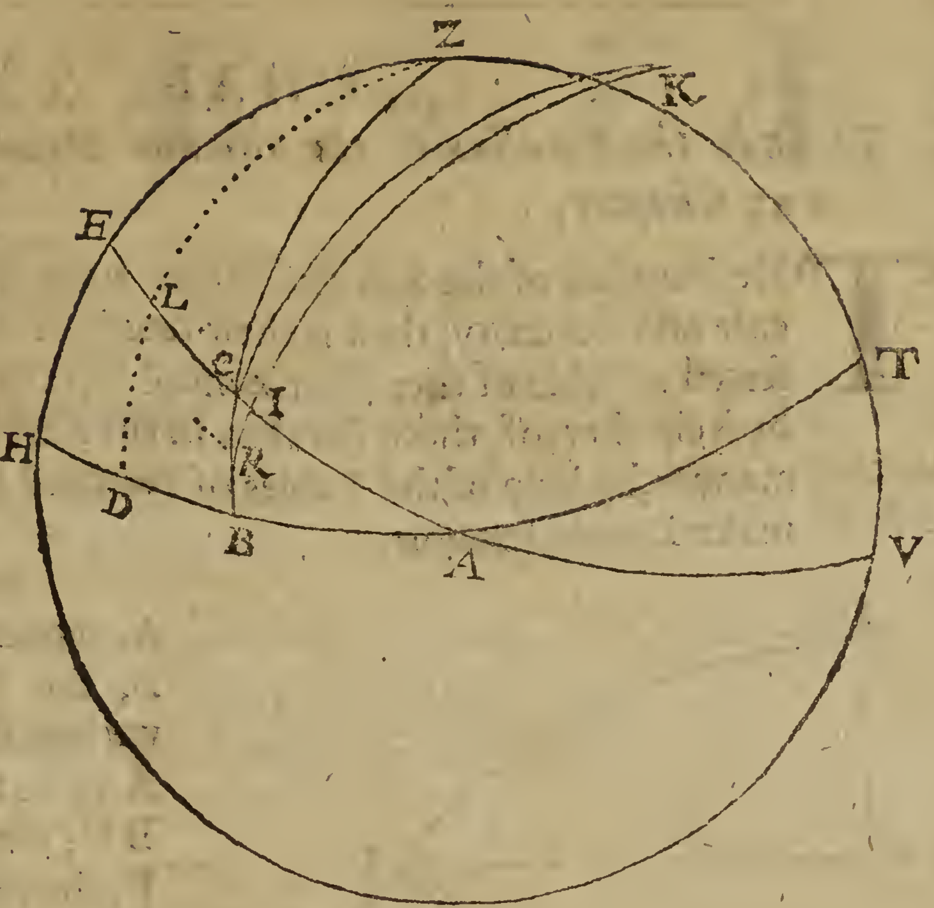
CHAP. XXIII.

Of the Parallax of the Sun, Moon and Stars, in Longitude and Latitude.

THe Parallax in Longitude is an Arch of the Ecliptique (or parallel thereto) intercepted between two great Circles, whereof the one paſſeth from the Poles of Ecliptique and the true place, the other from the ſaid Poles by the apparent place, ſo that the Parallax of Longitude is onely the Diſcrepancie, or Difference of the true and apparent Place according to the Longitude of the Ecliptique.

The Parallax of Latitude is an Arch of a great Circle paſſing by the Poles of the Zodiaque to the apparent place of the Starre, intercepted between two Circles of the Ecliptique equally diſtant, whereof the one paſſeth by the true place of the Starre, and the other by the apparent Place.

In



In the Diagram annexed, admit C be the true place of the Planet, R, the apparent place, and C R the Parallax of Altitude then is the Parallax of Longitude, the Arch of the Ecliptique C I, which is intercepted of the two great Circles K L. and K C. And the Parallax of Latitude is an Arch of the great Circle K I R, intercepted between I the Ecliptique, and the Pricked Line paſſing by R, a parallel thereof. Theſe things premiſed, we ſhall haſten to practiſe, and by the way ſhall inſert ſome ſhort Directions, to know when they have Parallax of Longitude onely, and when Parallax of Latitude onely, and when Parallax both of Longitude and Latitude.

1 If the Verticall line (or line paſſing from the Zenith to the Planet) be the Signifer, there is then no Parallax of Latitude, but onely of Longitude.

2 If the Verticall line paſſing by the Planet fall directly upon the Signifer, making thereby right angles, there is then no Parallax of Longitude, but onely of Latitude.

3 If the Verticall line paſſing by the Planet fall upon the Signifer with oblique angles, the Planet then hath Parallax both in Longitude and Latitude.

CHAP. XXIV.

To Calculate the Parallax, both in Longitude and Latitude.

BY the 20 Chap. we found, that when the ☉ is in o ♊, diſtant from the Merid. 45^{d} *ad Ortum*, the Parallactical is 65^{d} 13′ 47″, as it is repreſented in the Diagram of the laſt Chap. by the angle A C B, and becauſe the Verticall line Z B, falls upon the Ecliptique E A V, with oblique angles at C, the ☉ hath therefore Parallax both of Longitude and Latitude according to the 3^{d} Rule of the laſt Chap. wherefore to finde the Parallax of the ☉ in Longitude I C, and the Parallax in Latitude I R. I ſay,

I.

As the Radius, 90^{d},	10,000000
To the Tangent of C R 2′ 20″;	6,831703
So the Co-ſine of the angle R C I 65^{d} 13′ 47″,	9,622191
To the Tangent of C I 0′ 59″:	6,453894

II

As the Radius 90^{d},	10,000000
To the Sine of the Angle R C I 65^{d} 13′ 47″;	9,958083
So the Sine of C R 2′ 20″,	6,831703
To the Sine of R I 2′ 7″:	6,789786

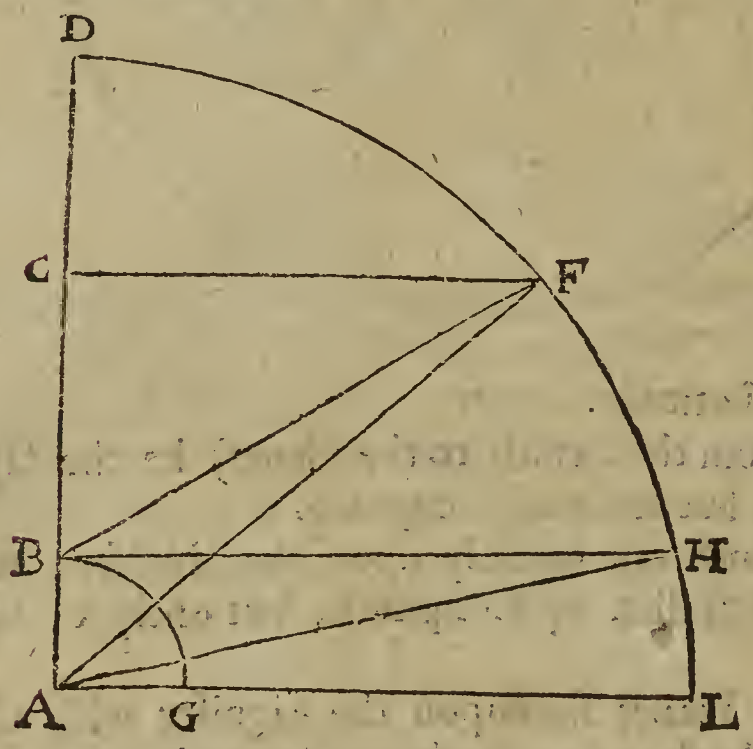
Therefore the Parallax of the ☉ in Longitude C I is 0′ 59″, and the Parallax in Latitude R I is 2′ 7″.

After the ſame manner may the Parallax of the ☾, and other Planets be found in Longitude and Latitude at any moment, in any Region, or Latitude whatſoever, by obſerving the premiſſes.

CHAP. XXV.

To finde the Parallax of the Sun and Moon, otherwiſe then is taught in the 22 Chapter.

THe Parallax of the Sun and Moon cannot poſſibly be obtained with more eaſe and dexterity, then is their taught in the 22 Chap. yet becauſe I have inſerted a Table of their Horizontall Parallax, I ſhall here ſhew you, how that by help thereof, there Parallax in the Circle of Altitude, may be found after another manner, by help of the Tables of Naturall Sines and Tangents. But I proceed firſt to make Demonſtration.



In the Diagram annexed.

A, repreſents the Center of the Earth.

B, the Superficies or place from whence we behold the Starre.

A G L, the true Horizon.

B H, the apparent Horizon.

F, the place of a Starre. D, the Zenith.

L F, the Altitude.

D F, the diſtance from the Zenith.

A H B, the Horizontall Parallax.

A F B, the Parallax required in the Altitude given.

According to the Examples in the 22 Chap. we are to finde the Parallax of the Sun in the Circle of Altitude when he is Perig. and diſtant from the Zenith 77^{d}, and to finde the Moons Parallax in the ſaid Circle when ſhee is alſo Perig. but diſtant from the Zenith D 45^{d}, therefore in this Diagram, I number the diſtance of the Sun from the Zenith 77^{d}, *viz.* from D to F.

B A F 77^{d} 0′, whoſe Sine C F is,	97437
Sine of the Com plement C A 13^{d} 0′ *viz.*	22495
Sine of the Horizontall Parallax A H B 2′ 25″ Subſtr.	69
Reſts B C	22426

Then in the Rectangled Triangle B C F, the Analogie is,

As B C 22426, to C F 97437. So B C the Radius, to the Tangent of the angle C B F 434482, whoſe Arch is 77^{d}. 2′ 20″, from which detracting the augle C A F, 77^{d} 0′ it leaveth the angle A F B 2′ 20″, which is the Parallax of the Sun in Altitude, agreeing to the Doctrine of the 22 Chap.

In the ☾.

Angle D A F, 45^{d} 0′. Sine C F	70710
Sine of the Complement C A 45^{d} 0′	70710
Sine of her Horizontal Parallax A H B 60^{d} 49′. Subſtr.	1769
Reſts BC	68941.

Then I ſay,

As B C 68941, to C F 70710. So the Radius B C 100000, to the Tangent of the angle C B F 102566, whoſe Arch is 45^{d} 43′ 32″, from which taking the angle C A F, 45^{d} 0′, there remains the angle A F B 43′ 32″, which is the true Parallax of the ☾ in her Circle of Altitude, and is the ſame that was found in the 22 Chap.

This way I ſhew onely for Variety, not that I would have my Studeut apply this to Common uſe, as in Calculating Eclipſes, and the like, in reſpect of the difficulty, but rather to make uſe of that in the 22 Chap. which is altogether as exact and far more eaſie and expedite, being performed by the Canon of Artificiall Sines and Tangents, which are inſerted in this Book, whereas this manner of Operation is wrought by the Naturall. So that Multiplication and Diviſion is here neceſſarily required, but in the other onely Addition and Subſtraction.

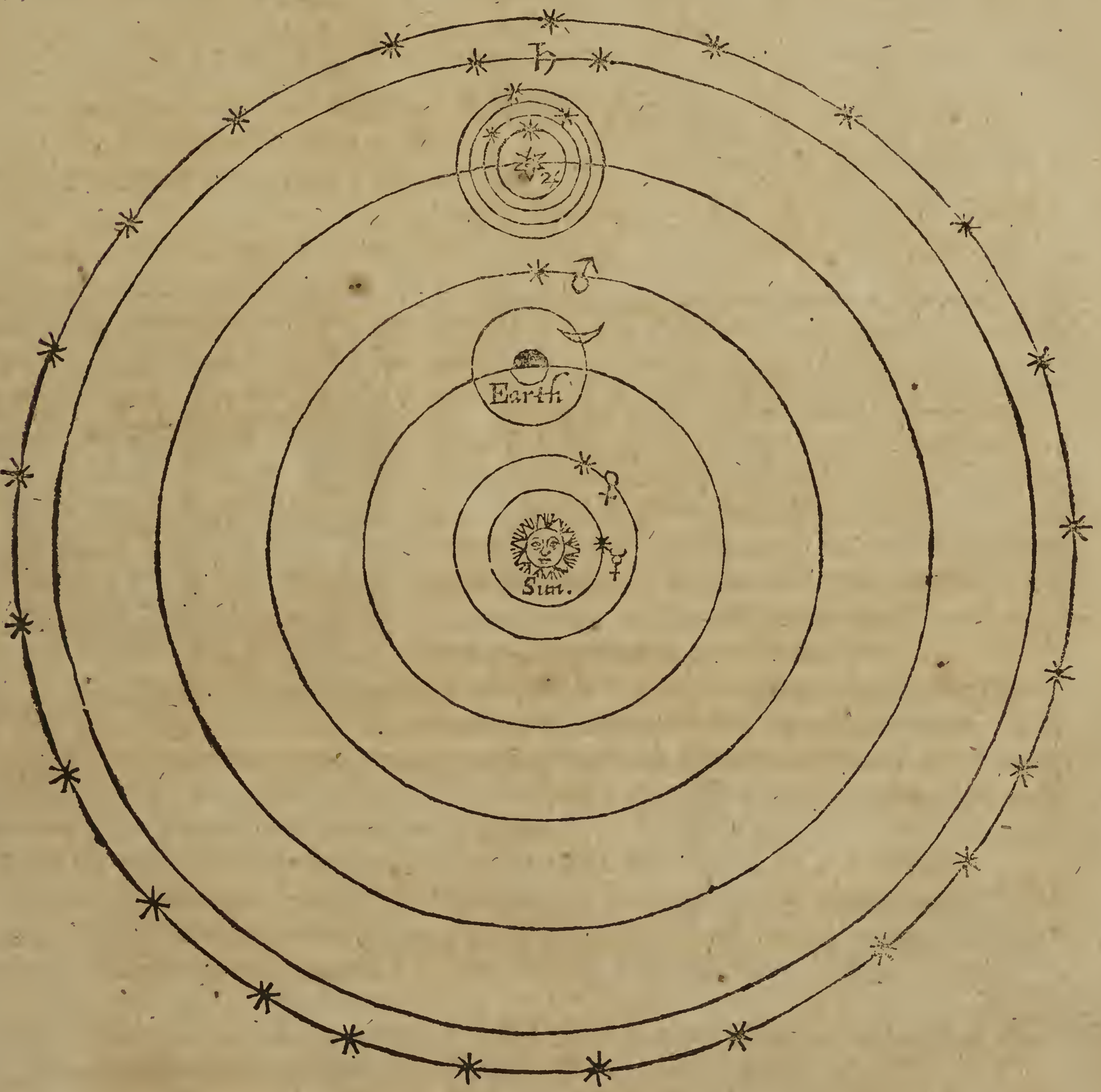
THE END OF THE SECOND BOOK.

HARMONICON COELESTE:

THE THIRD BOOK.

Conteining a new, accurate, and moſt eaſie Theorie
of the *Sun*, *Moon* and other *Planets*, with the Order,
Form, *and* Syſteme *of the* WORLD.

The Syſteme of the Viſible World.



By VINCENT WING.

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HARMONICON COELESTE:

The Third Book:

CHAP. I.

THE Theoricall part of Aſtronomy, (ſo called *à Theoriis*) is a doctrine whereby (as it were with Manuall Inſtruments) the Motions of the Planets are lively repreſented to the eye, for as in a Glaſſe wee behold the form, faſhion, and alſo motion of the body, ſo may we by this Theoretical Doctrine, not onely ſee the form and order of the Sphæres and Orbes of all the Planets, but alſo apprehend moſt ſuddenly the common Accidents of all the Planets, and may thereby be able to ſalve all their apparent motions.

The Subject of this Theoreticall Doctrine is the proper motion of the Planets and Stars, which we call ſecond motions, becauſe that contrary to the apparent Diurnall motions of the Planets and Stars from Eaſt to Weſt (which is an appearance cauſed by the daily motion of the Earth) their own proper Motions, of which wee ſhall here treat, are towards the contrary Part, namely from Weſt to Eaſt.

The primary end of this Science is to ſalve the *Phenomena*, or appearance of the Stars, and to finde their true places to any time given. The ſecondary end is to finde out the Scituation, Order and Form of the World, and the Parts thereof.

The Principles of this Doctrine, whereby wee come to ſalve the appearances in the proper motion of the Planets, *are theſe ſix following.*

1 That the ☉ is placed in the middle of the World, in or about the center of the Sphære of the fixed Stars, and hath no circular motion, but centrall onely.

2 That the primary Planets are each of them in their proper Syſtems, moved about the ☉, and accompliſh their Periodicall Revolutions, moſt exactly in their determinate and appointed times.

3 That the Earth is one of the Planets, and with her annuall motion about the ☉, deſcribeth her Orbe in the middle between the Orbes of ♂ and ♀.

4 That the ſecondary Planets are ordinarily moved about the primary Planets, reſpecting their bodies for their common Nodes or Centers.

5 That the Secondary Planet the ☾ is moved about the Earth, as her Center,

where by the annuall motion of the Earth hath not onely relation to the Earth, but by conſequence to the center of the whole Sphære of the Earththy Planet.

6 That as this primary Planet the Earth is environ'd with the Sphære of the ☾, ſo are ſome of (if not all) the other primary Planets, who have in like manner their Moons, or Concomitants encompaſſing them.

CHAP. II.

That the apparent Heavens have no ſolid Orbs.

THere are very many, even to this preſent day, that ſuppoſe the Heavens have ſolid Orbes, who bring ſome ſuperficiall, an ſeeming Reaſons for their aſſertions; for if (ſay they) the Heavens have no ſolid Orbes, how ſhould the Planets ſo exactly obſerve and keep their conſtant and regular Courſes and Motions in the Heavens without the leaſt jot of uncertainty, whereas if they ſhould move as Birds in the ayre, it could not then be poſſible in Nature, but that they muſt deviate from æquality: For anſwer hereto, let ſuch know this, that the motion in the Planets is eſſentiall, and given them of God (the Almighty Creator of all things) in the beginning, whereby (by the decree of an eternall Law) they are compelled to keep their conſtant and regular courſes and motions in the Heavens, as experience daily verifies, but that the Stars ſhould have ſolid Orbs we utterly reject it, as not probable (yea altogether impoſſible) *in Rerum Natura*, and this *Tycho* (refelling the ſolidity of thoſe Orbs we call Cœleſtiall) doth evidently prove three manner of ways, First, from the motion of Comets, Secondly, from the irrefraction of the Rayes of the Stars, and laſtly, from the Poſiture of the Planets, and proportion of their Orbs. And certainly, were their Orbes ſolid, it were impoſſible for Comets to paſſe from one Orbe to another, in reſpect of their ſolidity, but the contrary is ſeene, as *Tycho Brahe* in his own time moſt acurately did obſerve, the ſame is dayly verified from the light and appearnce of the Starres, for the earth being placed out of the center of the Planetarie Orbes, it muſt neceſſarily follow, that if their Orbes were ſolid, their light would be more dim, and their bright Rayes appear more broken and refracted, and hence would follow a Multiplicity of refractions, inſomuch, that the Rayes of the Stars being toſſed from one Orbe to another, would be ſo diverſly multiplyed, that in ſhort time, the Planets and Starres ſhould appear very irregular in motion, and in places far diſtant from their true Seates in the Heavens, ſo that in one volution of this terreneall Planet we live on, there would appear a wonderfull variety in their motions and diſtances. Laſtly, the noble *Tycho* finding by his acurate Obſervations, that the Planet ♂ in his Achronicall Poſitures, was neerer the earth then the ☉, and ſometimes far mounted above him, he thought this permutation could not be poſſible if there were ſolid Orbes, ſeeing that the Orbe of ♂ ſhould interſect and cut the Orbe of the ☉, although this of *Tycho* holdeth not altogether true, that theſe Orbs ſhould cut each other, yet accordiug to the Genuine Hypotheſis and Syſteme of the World aforegoing, this of *Tycho* is really verified in the Secondarie Planets; as in the ☾, that moves about the Earth, who twice in her revolution interſects the Earths Orbe, and the like may be ſaid of thoſe Concomitants, or Guardians of ♄ and ♃, which move about their Bodies, and interſect their Orbes, as the ☾ doth the Orbe of this Terreſtiall Ball, and now if this be not ſufficient to prove a fluidity of Subſtance in thoſe parts we call the Heavens, wee muſt then confeſſe a mutuall penetration of their ſolid Orbs, or elſe denie the motion of the Heavens, both which common reaſon tels us to be impoſſible, and not to be admitted of.

CHAP.

CHAP. III.

That the Sun is the Center of the Viſible World.

IN the following Chapters of this third Book, it will evidently appear to every cleer-ſighted man,that what we ſhall here deliver concerning this point is nothing but truth, the firſt that entertain'd this opinion for reall,was *Philolaus Pythagoras*, whoſe iudgment and dexterity of apprehenſion was moſt exquiſite, notwithſtanding thoſe brutiſh times wherein he lived, but after ARISTOTLE had drawn the World to favour his fond conceits, this famous diſcoverie of the truth became to be eclipſed, and ſo continued for many Centuries of Yeares, yea even untill this laſt age, when it pleaſed God to raiſe up ſome noble and heroick wits to make an abſolute diſcovery, inſomuch that now this opinion is by all our beſt Maſters of Aſtronomy, granted for no leſſe then truth , for as the continued obſervations of all Aſtronomers in all ages, do perſpicuouſly prove the ſame, ſo is it moſt proper that the ⊙ which is the moſt worthy body of all the Planets,ſhould retain the moſt worthy place amongſt them, which muſt needs be acknowledged to be the Center, beſides if we do but conſider, the Sphæricall forme of the World (which you may diſcerne by the former Syſteme) is it not then (I ſay) moſt proper, that the ⊙ (who is the onely giver both of light and heat to all the Planets round about him) be in the Center? from whence he may beſt diſperſe the ſame (by ſending forth his Radiant beames) into all parts of the Circumference, which otherwiſe cannot ſo well be done, were he placed in the Circumference, or any other point without it, but onely in the middle. And laſtly, is it not moſt certain that the two Planets ♀ and ☿ reſpect no other Center then the ⊙, and ſo being placed within the Orbe of the Earth, towards the Center, they can never appear to us (in this middle Planet) neither to be in □, nor ☍ of the ⊙, and this was the main cauſe that induced the Ancients to aſſign them a mean motion equall to that of the Sun, and refer the inæquality or motion to thoſe fictious Epicycles. The like may be ſaid of the other three primary Planets placed without the Orbe of of the Earth, though it be not ſo perceptable to vulgar apprehenſions, and for further proofe of this aſſertion infinite reaſons Aſtronomicall might be given, but I paſſe them by, hoping that the following Demonſtration in this Booke, will be ſufficient to evince the moſt ſtiffe opinion oppugnant hereunto, therefore ſeeing the ⊙ is the Eye of the World, and very Fountain (it ſelf) of pure light, the Center doth of right moſt fitly belong unto him, from whence (one every ſide) he may directly behold the moſt fixed concave of all the Planets and Stars with right angles.

CHAP. IV.

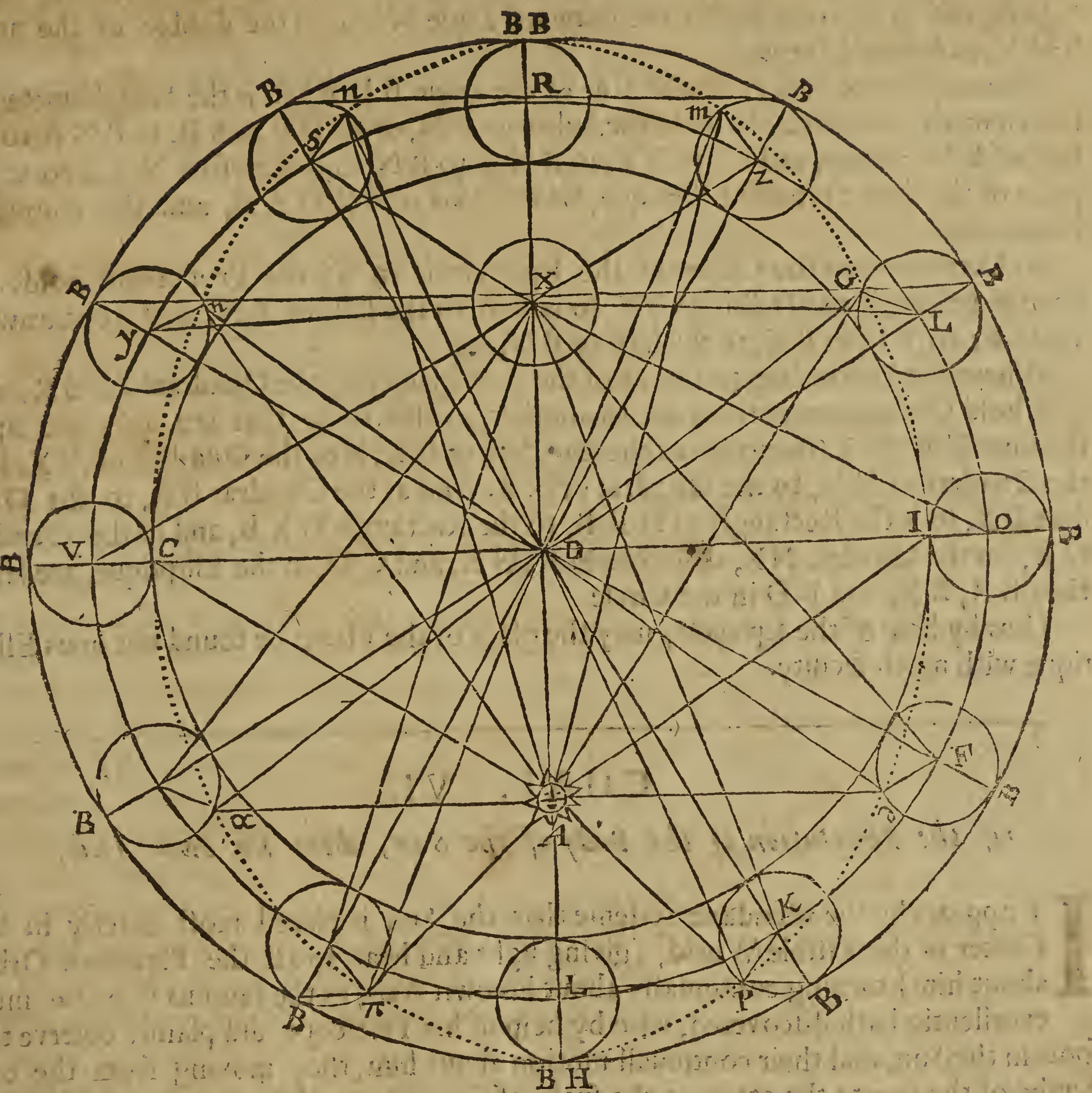
Of the order of the other Sphæres.

THere are ſeven Planets obſervable (beſides the Concomitants of ♄ and ♃) whoſe Orbes are imaginarie Circles, whereon their glittering bodies move and wheel about, (as is deſcribed in the Syſteme of the World.) Thoſe we call primary Planets, whoſe bodies move ſimply about the ⊙, and thoſe ſecondarie Planets which turn about the primary Planets, whereby it comes to paſſe, that beſides their own proper motion about the body of their primary Planet, they participate alſo of the motion of the ſaid primary Planet, which moves about the ⊙. Of this kind ♄ is obſerved to have two ſecondary Planets encompaſſing his body, which by help of the Teleſcope, are found to be ſometime neer, and ſometime further remote from him. In ♃ is obſerved four Stars of like kinde, which wheel about his body, as their proper Center, the firſt is diſtant from him to the ſight about 6 Semidiameters of the Earth, the ſecond 8, the third 10, and the fourth ſome twenty. Theſe ſecondarie Planets (as the Order of the other Planets is) when they are above ♄ or ♃ are moved from Weſt to Eaſt, but being under them, they are moved to the contrary, as in reſpect of the Earths Poſition, and by this meanes come ſometime to interpoſe, and ſometime to be hidden of their primarie Planets, about which they move. The firſt of theſe next the Center, accompliſheth its Revolution about ♃ in one day 18 houres, the ſecond in three dayes 13 houres, the third in 7 dayes, 4 houres, and the fourth and fartheſt from him, in 16 dayes and 5 houres. In like manner the Earth hath one, which we call the Moone, who by reaſon of her vicinity to the Earth, appears very great to our beholdings, though its probable, that in her ſelf, ſhe is as ſmall in magnitude as the Companions of ♄ or ♃; but as for ♂ ♀ and ☿ it cannot well be obſerved, whether they have any of like nature about them, or no, but we ſhall not at this time treat further of theſe ſecondarie Planets excepting the ☾, in regard, their motions are not yet well known, neither by few obſerved, and therefore ſhall treat of thoſe obſervable, and by the way ſhall ſhew how to deſcribe the Ellipſis, wherein the Planets move, and how by the help of two Circles, it may be projected by a neat Artifice; whoſe Demonſtration followeth in the next Chapter.

CHAP. V.

Of the Elliptique wherein the Planets move, and of the projection thereof.

IT appeares by obſervation that the Wayes of the Planets in the Heavens are Elliptical, the firſt vigilant Obſerver thereof was the admired KEPLER, ſince whom it is received as a generall Truth, and though it cannot ſo well appear in ♄ ♃ or ♀ yet in ♂ and ☿ its very perceptable, as may be gathered from acurate Obſervation. In which Elliptique there is an imaginarie point diſtant from the Center towards the Aphelion, the half of the firſt Inæquality, which we call the Cone or Umbilique point, to which place the Equality of motion is referred. And becauſe the point of the middle motion, is diſtant from the point of the apparent all the firſt Inæquality, the Center and middle of the Elliptique Orbite, is placed exactly between the points of the middle and apparent motion, ſo that the Center of the Elliptique is removed ſo far from the point of the apparent motion, as it is from the interſection of the Axis of the Cone, whereby both the point of the middle motion, and the point of the apparent, which is the ☉ are called Umbilique points, both which are of ſpeciall uſe in the indagation of their motions. Now to finde the place of a Planet in his Elliptique *Kepler in Epit. Aſtro. Copernic.* teacheth how it may bee obtained, but *Bullialdus* (to make the operation more eaſie) ſhews how to performe the ſame by an Epicyle, whoſe motion is double to the motion of a Planet in his Orbite, and ſo by the ſolution of right lined Triangles, it may be found with more eaſe, which way wee embrace, as very rationall, though wee ſomewhat diſſent from him in the Proportion thereof, for *Bullialdus* imagineth the Æquation of the firſt part of the Inæquality, to ariſe from the inæquall habitude of the Elliptique, and Circle Equant, which is nothing but a meer ſuppoſition, and *Kepler* thinks it onely Phyſicall, but I differ from both therein, and take the firſt part of the ſaid Æquation to ariſe from the ſame cauſe the latter doth, namely, to emerge from the Intervall, or diſtance of the Conicall point of Æquality from the Center of the Elliptique, as the latter doth from the diſtance of the other Umbilique from the ſaid Center, yet admitting of Variation in the Circle Equant, whoſe motion and magnitude is ſuppoſed to be equall in all reſpects with that of the Epicycle, and thereby the Variation relates to the motion of the Epicycle, diminiſhing the angle of the Excentricall Æquation when a Planet is in the higher part of his Orbite, and is inclining in his Elliptique Path, towards the Center, but when he comes into the nether part thereof, and begins again to decline, and depart farther from the Center, the Variation augments the ſaid angle by little, according to the motion of the Equant, which hath altogether relation and dependance upon the Epicycle. Now in regard the Orbe wherein the Planet moves is Ellipticall, as I ſaid before, I ſhall therefore here ſhew how the Ellipſe may be projected by two Circles, which way is both demonſtrative, and conſentaneous to truth and obſervation: For Demonſtration ſake, I have added the following Figure.



In this Diagram, the pricked Circle noted with the letters B N C α π H P O G B, is the Elliptique Orbe wherein the Planet moves, and the Circle R Y L O R is the Excentrique, which is an imaginry Circle, wherein the Center of the Epicycle is ſuppoſed to be carried about, the Radius of which Epicycle is equall to the Radius of the Circle æquant (X K) whereunto it hath altogether relation & dependance, & the greater it is, the greater is the variation of the way of a Planet from the Circle, for the Planet being Aphelion, or fartheſt removed from the ☉, he is in B B, when Diacentron, he is in C, and when he is Perihelion, he is in B H, ſo that when a Planet moves from B B towards C, the motion of the Epicycle is double thereunto, but to the contrary part, that is to ſay from B, by N to Y, as when the Center of the Epicycle is in S, diſtant from his Aphelion 30^{d}, the motion of the Epicycle B N is 60^{d}, ſo that when he comes to C 90^{d} from the Aphelion, the motion of the Epicycle B C is 180 , becauſe the motion of the one is double to the motion of the other, by which meanes the Epicycle deſcribes the Elliptique Orbe of the Planet, and ſerves to finde his true place in the ſaid Elliptique, and his true diſtance from the Aphelion thereof. But for further illuſtration obſerve, that from the Hypotheſis of this double motion of the Epicycle, the angle B S N is double to the angle R D S, and the angle B Y N to the angle R D Y, &c. Now becauſe the angle B S N is double to the angle R D S, and S D V is the complement to the right, (but the angle N S Y, is the complement of the angle B S N to two right angles, which is the double of the angle S D R) therefore alſo the angle N S Y ſhall be the double of the angle S D V, for the Complement of the Double to the Semicircle, is the Double of the Complement of the ſimple Angle to the Quadrant.

When the Center of the Epicycle is in S, the Planet is in N, and ſo the angle N B S is equall to the angle B D V, and the inward angle B S N, is the double of the angle S D R, and ſo by conſequence the outward angle N S Y, is the double of the angle S M V, as before I ſhewed.

Then as D B to B R (*viz.* the Sine of the angle B D R) ſo is the Semidiameter of the Epicycle B S, to the halfe of the Subtenſe B N, or as D B to S B, ſo B N R to the half of B N. Again, as D B to B Y, ſo B N R to B N, and therefore N is a point (or place of the Planet) in the Elliptique, whoſe Axis is B X D A B, and the conjugate Diameter C D I.

So likewiſe when the Center of the Epicycle is in Y, the Proportion holds the ſame as before, for as D B is to B X, ſo is Y B, to the half of B N, and contrariwiſe, As D B, to Y B, ſo B X, to the half of B N, &c.

Wherefore (according to the 22 of the 6 of Elements) the Quadrats of B R, and B X hold the ſame proportion one to another, as alſo thoſe that are deſcribed upon the lines N R, N X, therefore as the Quadrat of B R, is to the Quadrat of B X, ſo is the Quadrat of N R, to the Quadrat of N X. And as the Quadrat B R, to the Quadrat B X, ſo is the Rectangle of H R B, to the Rectangle H X B, and ſo the Quadrat N R, to the Quadrat N X, therefore N R, N X, and C D, in the Elliptique, are leſſer then B R, B X, and B D in the Circle.

Thus by help of the Epicycle, may the place of the Planet be found out in its Elliptique with much facility.

CHAP. VI.

Of the Revolution of the Body of the Sun, about his own Axis.

IT appears by the Mundane Syſteme that the Sun is placed moſt exactly in the Center of the Viſible World, (giving light and heat to all the Planetarie Orbes about him) turning continually about his own Axis, as the famous *Galilæus* moſt excellently hath diſcovered, who by help of his Teleſcope did plainly obſerve the ſpots in the Sun, and their continuall motion about him, they moving from the one Limbe of the Sun to the other, in the ſpace of 12. 13. or 14 days, as *Kepler* ſaith, *Epit. Aſtron. Pag.* 514. being to the Eye ſwift in motion when they appear *in medio corpore*, and ſlower when they come towards his ſuperficies ; and by conſequence it is proved, by the converſion and wheeling about of theſe ſpots, that the Sun is turned once about his owne Axis in 26 dayes, or thereabouts, which motion was altogether unknown to the Ancients, yea to the famous *Copernicus*, and all other, till the learned *Galilæus* his time, but of what nature theſe ſpots are, I cannot ſay, onely I ſhall conclude with *Bullialdus Lib* 1 *Cap.* 8 *Aſtron. Philoſ.* *Analogia tamen quadam ſimiles eſſe videntur iis, quas cernimus in ferro candenti, & exprunis extracto, ſtricturis, vehemente igni, quo ferrum incenſum eſt, propulſis & à maſſa ſecretis. Poſſumus itaque exiſtimare maculas illas eſſe fuligines è maſſa Solis vi caloris expulſas, quemadmodum alicubi* Galilæus *explicavit.*

CHAP. VII.

Of the diurnall reſolution of the Earth, about her own Axis.

OVer and beſides the annuall motion of the Earth (which in this Book is cleerly proved) ſhe hath alſo a Diurnall motion about her own Axis, as Obſervation daily and hourly manifeſts, for ſhould it otherwiſe be, that the Earth ſhould not be turned about her own proper Axis (*Motu diurno*) it would follow, that the Stars ſhould not every day be ſeen to riſe and ſet, yea thoſe people who live under the Equinoctiall might then obſerve ſome of the Stars always *Supraterranean*, and ſome again always *Infraterranean*, which agrees not to the Phenomena; but directly oppoſeth the verity of our Hypotheſis: See *Bullialdus (alius Philolaus) De Syſtemate Mundi*, *Pag.* 132, where he proveth that the Earth is moved throughout the whole Zodiaque annually about the Sun, and daily about her own Axis, as he there demonſtrates, to which Book I referre the Reader.

CHAP. VIII.

Of the Æquation of Civill Dayes.

I Shall not here ſhew the variety of opinions amongſt Authours concerning the Æquation of naturall Dayes, and how it hath been a Point much controverted, yea even of late yeares amongſt famous Scholers, and Aſtronomers of great note. The Ptolomaick Æquation was entertained by *Alphonſus*, *Copernicus*, and by the Authour of Prutenick-Tables, *Reinhold*, and generally by all others, till the learned *Tycho* gave it a ſtop, who by his acurate Obſervations of Eclipſes and the Moons motions, did endeavour to make a reſtitution, he admitting onely of the Inæquality as it ariſeth from the diſagreement of the Equinoctiall and the Ecliptique, which his learned Succeſſour *Kepler* in part rejects, and would have the ſaid Æquation to emerge from the Difference between the middle place of the Sun, and the Right Aſcenſion of his true place, which is more rationall and demonſtrative: but *Bullialdus* (whom we follow in this particular) doth herein ſomewhat diſſent both from *Tycho* and *Kepler*, for beſides the Tychonick Æquation (which ariſeth from the difference of the right Aſcenſions of the Equiuoctiall and Zodiaque) he introduceth alſo a ſecondarie Æquation from the Inæquality of the daily Revolutions of the Earth about her Axis, occaſioned by the Excentricity, or Excentrique Æquation, which cauſeth the ſaid Inæquality in her Revolution about her Axis, as by the Theorie of the Earth doth appear. Now therefore that the Æquation of dayes ariſing from theſe two Fountaines may be found, we are to gather the Right Aſcenſion of the point given, and the difference between that and the true place is the firſt part of this Æquation; & that we may know whether it doth augment or diminiſh the middle time, we muſt conſider whether the Right Aſcenſion be greater or leſſer then the Suns true place, if greater it ſubſtracts, but if leſſe it adds to the middle time. Next we are to obſerve that the inæquality of the Earths motion about her Axis, may either augment or diminiſh the ſame, for in the former ſemicircle, when the Co-æquate Anomalie is leſſe then *6* Signes, the former part of the Æquation is diminiſhed, but in the latter ſemicircle it is encreaſed, according to the proportion of the Excentrique Æquation.

When the Sun enters ♊ his Right Aſcenſion is $57^{d}\ 48'\ 6''$, hence the Difference between the point given and Right Aſcenſion thereof, is $2^{d}\ 11'\ 54''$ and ſo much is the Sun paſt the Meridian in reſpect of the middle time, and Right Aſcenſion of that Arch; but in regard the Sun is in the ſecond ſemicircle (here I ſpeak according to appearance) the Excentrique Æquation $36'\ 49''$ ſubſtracteth from the ſame, according to the quantity thereof, and therefore the true Æquation is but $1^{d}\ 35'\ 5''$, which converted into time, produceth $6'\ 20''$, which is the true Æquation of time, that was deſired.

CHAP. IX.

Of the Theorie and Motion of the Earth.

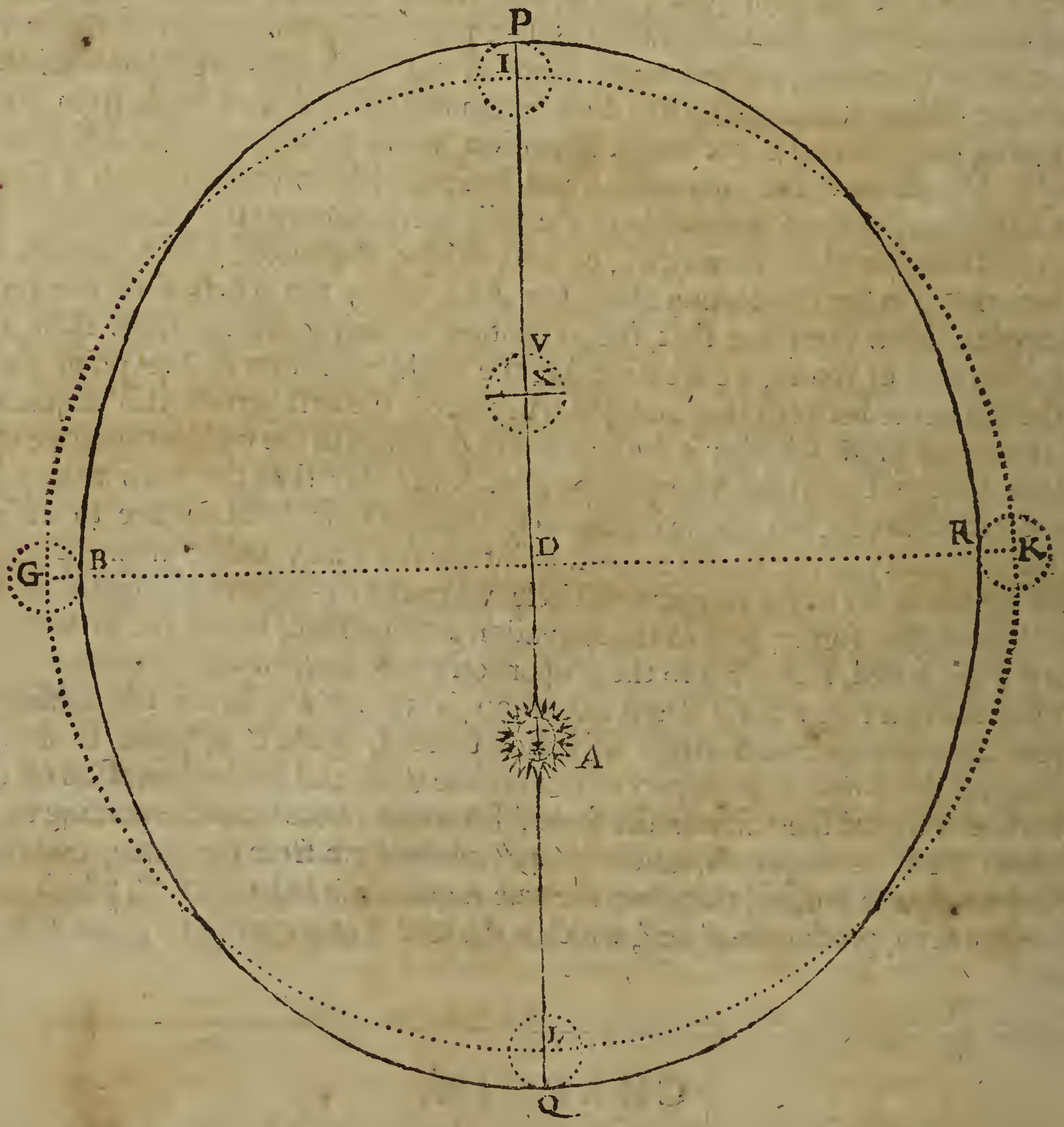
ALthough its probable the Sun have a motion about his own Center, yet its moſt certain he is ſcituate in the very Center of the World, and is the common Node of the Planetarie Syſteme, as is demonſtratively proved throughout this Book, and that the Earth in the middle of the other Planets) wheeleth about the Sun, making her Periodicall Revolution in 365 Dayes, 5 houres, and 49'. and the other Planets, ſome in longer, and ſome in ſhorter time according to the

Quantity and Proportion of their Orbites. And beſides this annuall motion of the Earth in its own Orbite, which is Excentrique to the Sun, ſhe hath likewiſe a Diurnall motion about her own Center which ſhe finiſheth in 24 houres, making thereby the Day Naturall, of both which motions I have treated elſewhere.

Now whereas PTOLOMIE and other Writers begin firſt with the Sun, as Moderator of all the other Planets, I ſhall not much digreſſe, and though not admitting of any Orbicular motion, of the ⊙, yet keeping and retaining his place as a fixed Point, contermine to the Centers of all their Orbites, by help whereof the true motion of the Earth and other Planets may be obtained with much Dexterity and Demonſtration.

And for as much as the apparent motion of every Planet depends upon the motion of the Earth, I ſhall here begin firſt with the Theorie of the Earth (or ⊙ if you will ſo have it) and deſcribe all ſuch Lines, Arches, Angles, Orbes, and Points, as are needfull and requiſite to be known for the Calculating his Motion, and afterwards by the Doctrine of Triangles, ſhall give you in the following Paradigmataes, a brief Synopſis of the Calculation.

A Figure of the Motion of the Earth about the Sun.



In this Diagram, A, denotes the place of the Sun and Center of the World: X, the Center of the Equant: D, the Center of the pricked Circle, or Excentrique of the Earths Orbite, whoſe Semidiameter D I, or D G contains 100000. In the Perimeter whereof is placed four Epicycles, the firſt in I, the ſecond in G, the third in L, and the fourth in K, which are there ſet down, not to ſhew any motion of the earth in the Perimeter of them, as prudent Antiquity for want of other helps deviſed, but to finde thereby the Inclination of the Earths Orbite, and Place of the Earth therein.

The Ecliptique noted with the letters P B Q R P repreſents the Orbite of the Earth, whoſe Aphelion Semidiametient is marked with P D Q, the Diacentron Diametient with B D R. The true motion of the Earth in this Elliptique (being numbred from P) is to be obteined by help of the little Epicycle, whoſe Center is ſuppoſed to be carried about in the Circumference of the pricked Circle, and the motion of this Epicycle, is double to the æquated motion of the Earth, though to the contrary part; ſo that when the Earth is Aphelion, ſhe is placed in P, the upper part of the Epicycle, but being at B, 90^{d} diſtant from her Auge, ſhe is then in the loweſt part thereof, that is to ſay 180^{d}, from the Aphelion of the Epicycle, becauſe the motion of the one is double to the motion of the other.

Upon the point X, is deſcribed another little Circle (which we call the Equant) whoſe Semidiameter X V (being equall to the Semidiameters of one of the Epicycles) is 16 parts, the Center of this Circle is diſtant from D, the Center of the Orbite 1787, being directly oppoſite to A, the Suns place, and this Circle ſerveth chiefly to finde the Inæquality of the Excentrique Circle, or Bi-ſected Excentricity, for when the Earth is Supra Diacentron, or in the higher Semicircle R P B, the variation is to be numbred in the loweſt Semicircle X W, but the Earth being Infra Diacentron, or in the nether Semicircle B Q R, the variation is to be accounted in the Semidiameter of the higher Semicircle from X towards V.

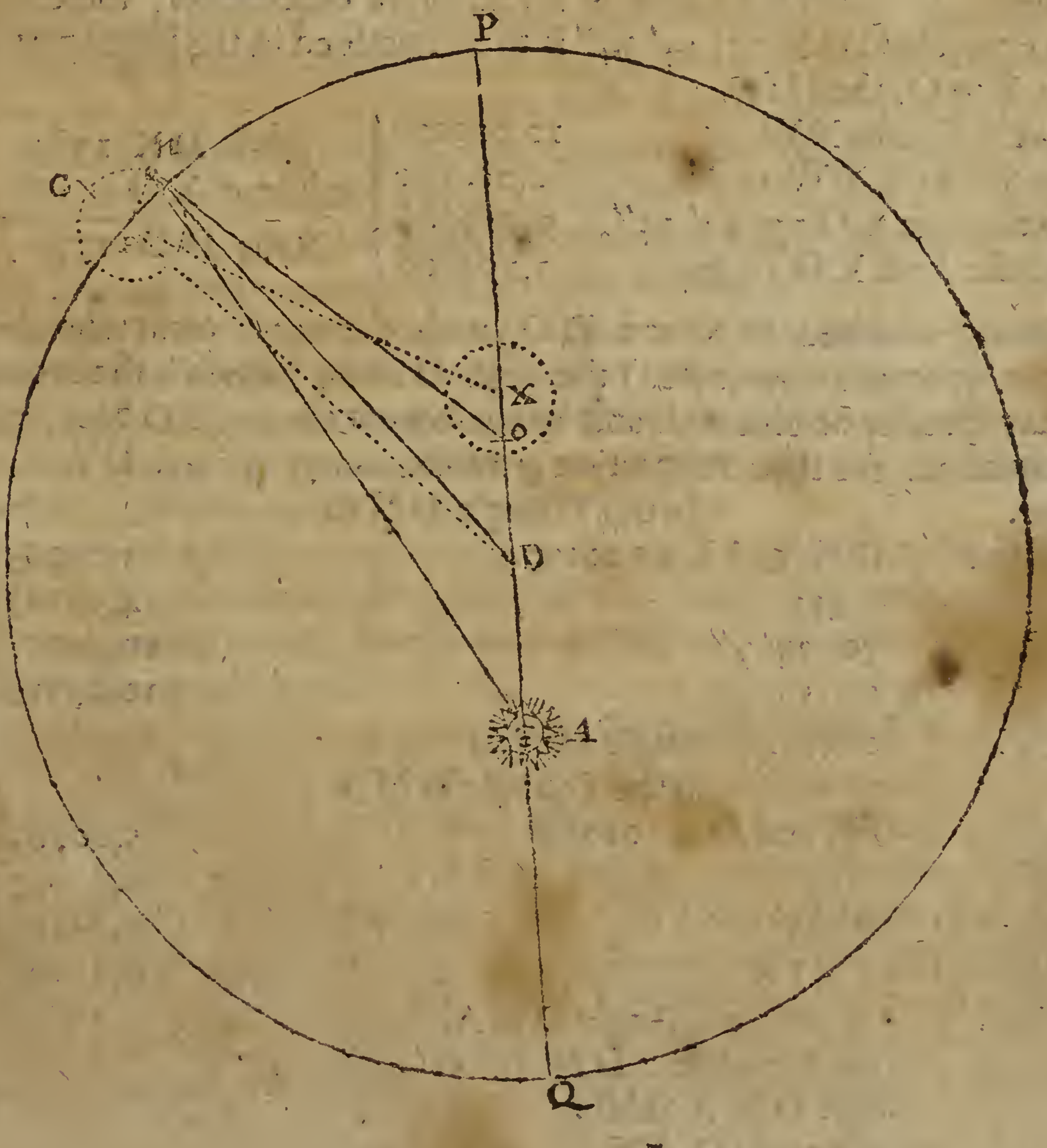
In the following Diagram, the middle motion of the Earth from its Aphelion is underſtood by the angle P X H, the excentrique place by the line D N, but the true place by the line A N.

2 The angle D H X is the Æquation of the mean Anomalie.
3 The angle P D H is the æquated Anomalie.
4 The angle H D N is the Ellipticall Variation.
5 The angle P D N is the Co-æquated Anomalie.
6 The angle O N D is the Excentrique Æquation.
7 The angle D N A is the Optique Æquation.

Laſtly, the Side A N is the diſtance of the Earth from the Sunne,

Theſe things thus premiſed, we next come to practice, as followeth in the Synopſis of the Calculation.

A Figure of the Earth's motion.



July

July 28 1650 at 12 noone, I obſerved the true place of the ☉ (by help of a Quadrant of 6 foot Radius) in $14^{d}\ 49'$ ♌, at which time according to my Tables the middle motion of the Sun is $136^{d}\ 5'\ 46''$, and the Aphelion of the Sun $96^{d}\ 34'\ 23''$, which being deducted from the Suns middle motion, leaveth $39^{d}\ 31'\ 23''$, which I number in the former Diagram from P the Aphelion to H, and ſo much is the angle P X H.

Therefore in the Triangle D X H, having D H and D X given, with the angle D H X, the angle D H X will be $0^{d}\ 39'\ 6''$: for the Analogie is,

As D H 100000,	5,000000
To the Sine of the angle D X H $39^{d}\ 31'\ 23''$;	9,803723
So D X 1787,	3,252125
To the Sine of the angle D H X $0^{d}\ 39'\ 6''$:	8,055848

From the ſimple Anomalie P X H	39^{d}	$31'$	$23''$
Subſtract the angle D H X		39	6
Remains the æquated Anomalie	38	52	17
Angle C H N	77	44	34

In the Triangle D H N.

1

D H 100000 ⎫
H N 16 ⎬ given
Angle D H N 101 56 38 ⎭

Angles { D N H, H D N } Side { D N } required

Summe of D H and H N 100016		5,000069
Difference 99984		4,999930
Tangent of $38^{d}\ 52'\ 17''$		9,906375
Tangent of 38 51 45		9,906236
Aggregate 77 44 2	Angle D N H	
Difference 0 0 32	Angle H D N	

2

Sine of the angle H N D $77^{d}\ 44'\ 2''$	9,989971
D H 100000	5,000000
Sine of the angle N H D $77^{d}\ 44'\ 34''$	9,989986
Side D N 100003	5,000015

From the æquated Anomalie P D H	38^{d}	$52'$	$17''$
Angle H D N ſubſtract			32
Reſt Co-æquated Anomalie P D N	38	51	45.

In the former Diagram the Earth is found Supra Diacentron, therefore the motion of the Epicycle C H N $77^{d}\ 44'\ 34''$ is to be numbred in the lower part of the Equant from X to O, then I ſay,

As the Radius X W 90^{d},	10,000000
To the Arch X W 16;	1,204120
So the Sine K O $77^{d}\ 44'\ 34''$,	9,989986
To the Arch X O 16 *ferè*	1,194106

From D X	1787
Subſtract X O	16
Reſts D O	1771

Now having obteined D N and D O, with the angle comprehended N D O (which is the Anomalie co-æquated) the angle O N D, (which is the excentrique Æquation) may ſpeedily be obteined, and by conſequent the angle D N A, which is the Optique Æquation, for their Proportion are alike, onely the Side D A is 1787 without variation.

In the Triangle D N O.

Summe of D N and D O 101774	5,007637
Difference 98232	4,992253
Tangent of $70^{d}\ 34'\ 7''$	10,452505
Tangent of 69 55 23	10,437121
Dif. 0 38 44 Angle D N O	

In the Triangle D N A

Summe of D N and D A 101788	5,007696
Difference 98214	4,992173
Tangent of $19^{d}\ 25'\ 52''$	9,547486
Tangent of 18 47 50	9,531963
Dif. 0 38 2 Angle D N A.	

From the angle P D N	38^{d}	$51'$	$45''$
Angle D N A Subſtr.		38	2
Reſts angle D A N	38	13	43

Againe

Again in the Triangle D N A.

Sine of the angle D A N $38^{d}\,13'\,43''$,	9,791551
D N 100003;	5,000015
Sine of the angle A D N $141^{d}\,8'\,15''$,	9,797592
A N 101402:	5,006046

Excentrique Æquation D N O	0^{d}	$38'$	$44''$
Optique Æquation D N A	0	38	2
Abſolute Æquation	1	16	46
Middle Motion of the Sun	136	5	46
Æquation ſubſtract	1	16	46
True Motion of the Sun	134	49	0

Therefore the true place of the Sun the ſaid 28 of July 1650 at noon, was in $14^{d}\,49'\,0''$ ♌, agreeing to Obſervation.

CHAP. X.

Of the Theorie and Motion of the Moon, and of the various In-æqualities in her Motions.

ALthough the Moon be a ſecondarie Planet, and is far leſſe in magnitude then any of the reſt, yet in regard ſhee attendeth (as it were) upon the Earth, and giveth greater light thereon then any Planet, and alſo deſcribeth the Moneths of the Year, I do therefore hold it meet to place her Theorie next unto the Earths, (or the Suns as vulgarly accounted) according as all the ancient Aſtronomers have done before us, whoſe Footſteps in this particular I ſhall here follow.

1 Now as the Earth and other Planets do each of them in their Peculiar Orbites move about the Sun, ſo doth this ſecondarie Planet the Moon move about the Earth, and ſo not onely the Earth, but alſo the whole Syſteme of the Moon is carried about the Sun in a Year, and hence it is that there ariſeth a threefold Inæquality in the Moons motion. The firſt is Periodicall, the ſecond Synodicall, and the third annuall. Her Periodicall Æquation is to be obteined after the manner of the other Planets, for it is of the ſame Quality, though differing in Quantity, as immediately we ſhall demonſtrate; but her Synodicall Æquation hath dependance upon her Elongation from the Sun, and is cauſed by the oblique ſcituation and vaſt emotion of her whole Syſteme out of the Center of the World, for the Earth (which in her mean diſtance is from the Sun 100000) is the Umbilique point of her Orbite, about which ſhe keepeth her conſtant gyre and motion as the primarie Planets do about the Sun, who is the Center of the World. The third Inæquality is but ſmall, and is onely cauſed by the variation of the Earths diſtance from the Sun, which may ſomewhat augment or diminiſh the angle of her Synodicall Æquation, but I proceed to make Demonſtration ſeverally of all ſuch Lines, Circles, Arches, Orbites, and Points, as are needfull to be known for Calculating her Motion.

2 The Auge of the Moon is a point of the Orbite wherein when the Moon is placed, ſhe is fartheſt remote from the Center of the Earth, the daily motion thereof being $6'\,47''$, according to the Succeſſion of the Signes, from which point the Anomalie of the Orbite is accounted.

3 The Orbite of the Moon is an imaginarie Elliptique Circle (like to that of the Earth) which carrieth the Moon about from Weſt to Eaſt according to the ſucceſſion of the Signes, though it is obſerved to be with ſome irregularity about its own Center, for the converſions of her Orbite are regular and made equall by the Center of the Circle Equant, which is the very point it ſelf of Equality: and becauſe the Center of the Equant, is in reſpect of the Earth, a point placed towards the Auge (*viz.* in the line of the Auges) it moſt evidently ſhewes, that the Motion of the Moon in her Orbite (according to the primarie Planets) is ſlower when ſhe is Supra Diacentron, or in the upper part of her Circle and ſwifteſt when ſhe is Infra Diacentron,

or the nether part thereof, becauſe (as I have ſhewed in the Theorie of the ſuperiour Planets following) a leſſer Portion of the Orbite belongs to the upper part of the Circle Equant, then doth to the nether part thereof.

4 The Circle Equant is a little Circle deſcribed upon the Center thereof X, whoſe Semidiameter X V contains onely two parts, whereof the Radius of the Moons Orbite D A is 4047 and this Circle ſerves to finde the variation of the Excentrique Inæquality, which is found (as afterwards is taught) by numbring the double of the Anomalie æquated in the nether part thereof when ſhe is Supra Diacentron, but in the upper part if ſhe be Infra Diacentron.

5 Upon the point D, which is the Center of the Orbite, is deſcribed an imaginarie Circle, in the Perimeter whereof is placed a little Epicycle, whoſe Semidiameter is equall to that of the Equant, and the motion thereof is double to the æquated Anomalie, being accounted from I, the Auge thereof, to N, &c. ſo that when ſhe is in the Auge or oppoſite Auge of the Excentrique, ſhe is always then in I, the Auge of the Epicycle, but being in K, 90^{d} diſtant from her Auge, ſhe is then 180^{d} from I, the Auge of the ſaid Epicycle, for the motion of the one is double to the motion of the other.

6 The Excentrique Æquation is an angle at the Moon underſtood in the ſecond Figure following by the angle O N D, ſo that the Excentrique place of the Moon is ſhewed by the line D N, which ariſeth from the Excentrique Excentricity D X, being corrected by the variation thereof.

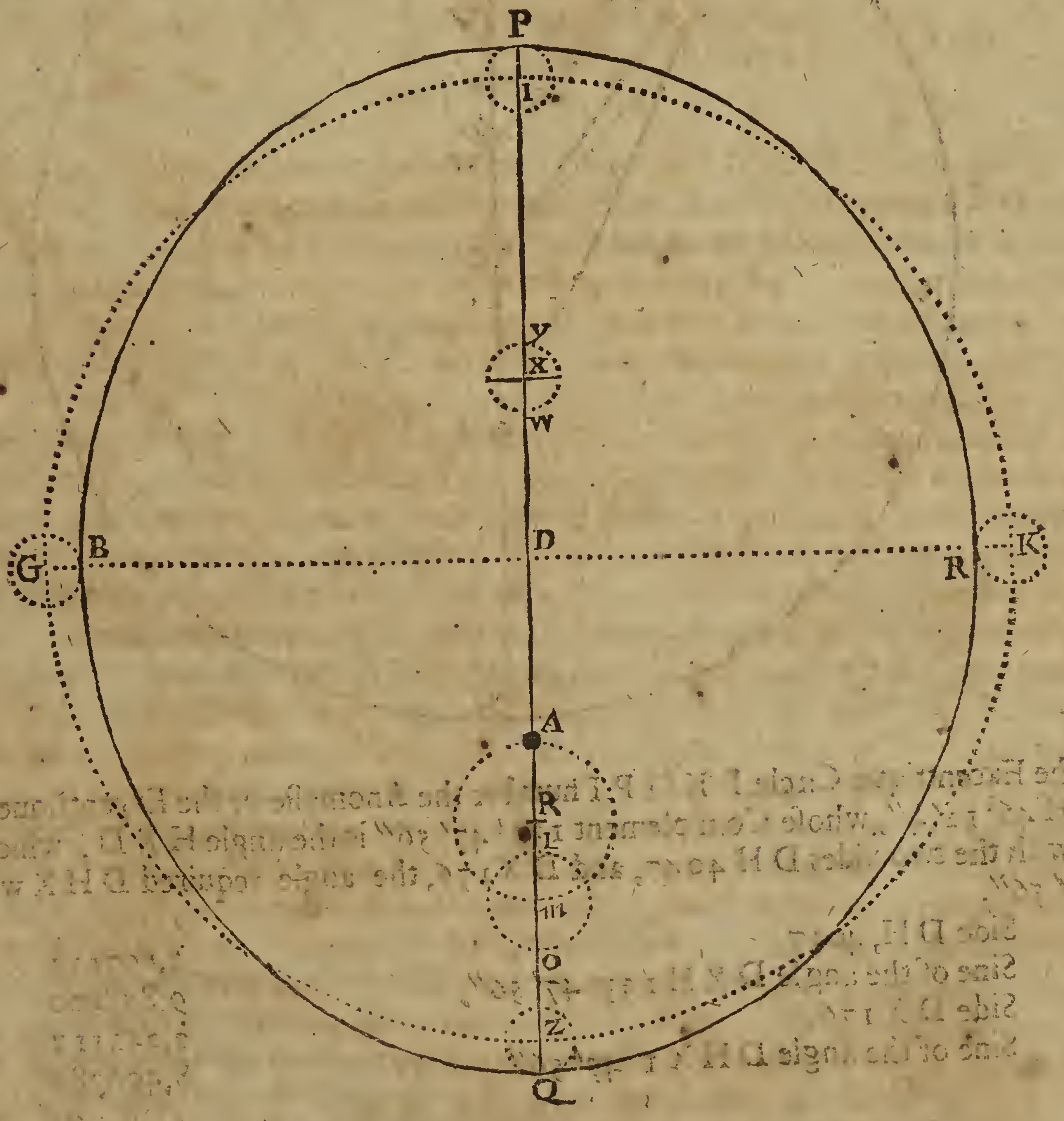
7 The Optique Æquation is an angle at the Moone ariſing from the other half of the bi-ſected Excentricity D A, being underſtood by the angle D N A, ſo that the place of the Moon from the earth, (as in reſpect to her own Orbite) is ſhewed by the line A N. And you are to note that the Summe or Aggregate of theſe two æquations is called the Compound, or abſolute æquation, which is to be ſubſtracted from the middle motion in the former Semicircle P K Q, and to be added in the latter, as the Figure it ſelf demonſtrates.

8 But the Moon being a ſecondarie Planet, running her Courſe about the Earth, and retaining it for her common Node, as the primarie Planets do the Sun (who is the Center of the Signifer) it thence followeth that the Moon, in reſpect of the removed Seats of her whole Syſteme, muſt neceſſarily be ſubject to a ſecond Inæquality (as is ſaid before) becauſe the viſuall line of her appearance, from A the Center of the Earth (which is not the Center of the Signifer) falls with oblique angles upon the Zodiacall Circle, and this is very apparent, for when her viſuall place concurres with the line of the Sun, making thereby Right angles with the Zodiaque, which is always in her Conjunction or Oppoſition with the Sunne, ſhe is then found to be altogether void of this ſecond Inæquality, as in its following place I have ſhewed.

9 Upon the point R, is deſcribed an imaginarie Circle, deviſed to finde the Synodicall Æquation of the Moon, whoſe Center R, is diſtant from A the Center of the Earth 88 parts, in the Circumference whereof, moves a leſſer Circle, whoſe Center is noted with the letter M, which is deviſed to finde the Synodicall Variation of the Moon. In the former, we call the angle R N M the Synodicall Æquation, and the angle R N M the variation thereof. And here note that the Synodicall Æquation conſiſts of three parts, the firſt part (as is deſcribed in the ſecond figure following) contains the angle A N R, and is found by giving the angle A, and the ſides including it, *viz.* A N, and A R. The ſecond part of the ſaid Æquation doth ſometime adde, and ſometime diminiſh therefrom, for in the Circumference of the greater Circle from A by Y to M is numbred the Synodicall Anomalie, whereby the angle R N M is the ſecond part of the Inæquality, and in the Example following is found to diminiſh the former part. Laſtly, to finde the variation, I number the Synodicall Anomalie in the little Circle from L by Y to O, and I finde the angle of Variation to be M N O, which in this Example augments the Quantity of her Synodicall Æquation according to the Proportion thereof.

The particular Dimenſions of the Moons Orbite.

Semidiameter of the Circle D G or D I.	4047
Semidiameter of the Epicycle B G or I P.	2
Which in the Circle Equant equalizeth X V or X W.	2
Bi-ſected Excentricity D X or D A.	176
In the Elliptique.	
Aphelion Semidiametient D P, or Perihelion D Q.	4049
Diacentron Semidiametient D B or D R.	4045
In the Circle of her Synodicall Revolution A M A.	
Semidiameter R M, or R A.	88
In the Circle of Variation O L O	
Semidiameter M O.	48



CHAP. XI.

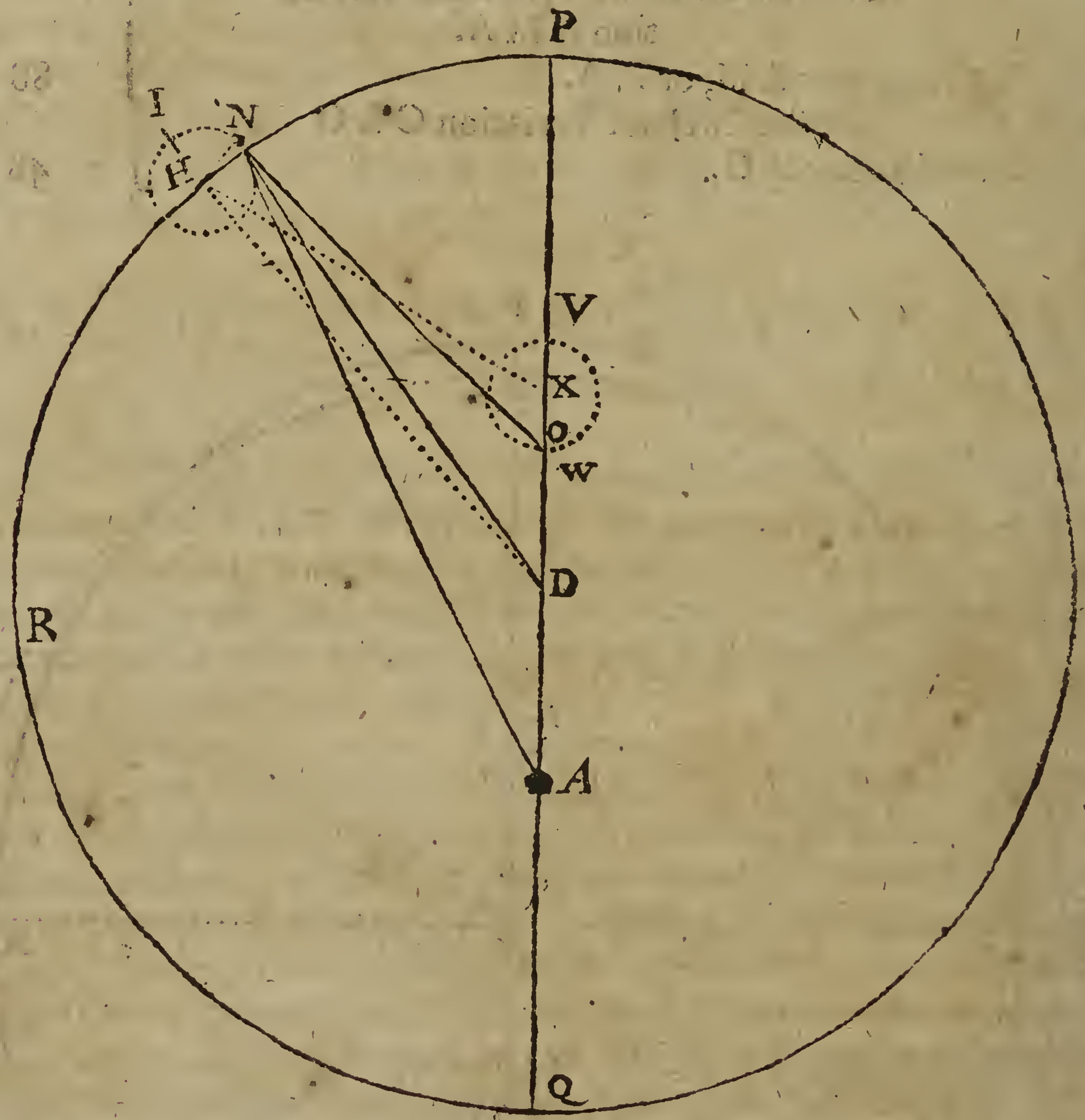
A Geometricall demonſtration of the true motion of the Moon with an Inveſtigation of her particular In-æqualities by the Doctrine of Trigonometry.

ANno 1587 Auguſt 17: Ho: 19 15′ T A, or 19h 22′ 30″ T M, the Moon being, in the Meridian of Uraniburge, Noble *Tycho* obſerved her in 26d 23′ of ♊, with Latitude 5d 14′ South.

For the difference of the Meridian of *London* and *Uraniburge*, is to be ſubſtracted 50′, whereby the time in our Meridian is 18ho 32′ 30″, at which time,

	Sig.	D	′	″
The true motion of the Sun is	5	4	5	47
The Diſtance of ☉ from the Earth		100910		
Middle Motion of the Moon	3	1	3	3
Aphelion of the Moon	1	14	50	59
Node Aſcend. A ☾	6	0	6	2
Anomalie of the ☾	1	16	12	4

Figure 1 of the Moon.



In the Excentrique Circle P K Q P, I number the Anomalie of the Excentrique from P to H 46d 12′ 4″, whoſe Com plement 133d 47′ 56″ is the angle H X D, which given, with the two Sides D H 4047, and D X 176, the angle required D H X will be 1d 47′ 56″.

Side D H, 4047,	3,607133
Sine of the angle D X H 133d 47′ 56″;	9,858400
Side D X 176,	2,245513
Sine of the angle D H X 1d 47′ 56″	8,496780

	D	′	″
Simple Anomalie P X H	46	12	47
Angle D H X Subſtr.	1	47	56
Anomalie æquated P D H	44	24	8
Motion of the Epicycle I H N	88	48	16

In the Triangle D H N.

Summe of D H and H N 4049	3,607348
Difference 4045	3,606919
Tangent of 44d 24′ 8″	9,990938
Tangent of 44 22 26	9,990509

Aggregate 88 46 34 Angle D N H.
Difference 1 42 Angle H D N.

Sine

Sine of the angle H N D 88^{d} 46′ 34″,	9,999900
D H 4047;	3,607133
Sine of the angle N H D 91^{d} 11^{d} 44″,	9,999905
D N 4040:	3,607138

Anomalie æquated P D H	44^{d}	24′	8″
Angle H D N Subſtr.		1	42
Anomalie Co-æquated	44	22	26

And becauſe the ☾ is Supra Diacentron, or in the upper part of her Circle, therefore I number the double of the Anomalie æquated 88^{d} 48′ 16″, in the lower ſemicircle of the Equant, from X to O.

Then I ſay,

As the Radius X W 90^{d},	10,000000	From D X	176
To the Sine X O 88^{d} 48′ 16″;	9,999905	Subſtr. X O	2
So the Arch X W, 2^{d},	0,301030	Reſts D O	174
To the Arch X O 2^{d}:	0,300935		

D N 4047
D O 174
Angle N D O 44^{d} 22′ 26″ } given

Angle D N O required

Ergo

As the Sum of DN,&DO4221 3,625415
To the Difference 3873; 3,588047
So the Tang. of 67^{d} 48′ 47″, 10,389524
To the Tang. of 66 2 11 10,352156
Difference 1 46 36 *viz.* Angle D N O, which is the Excentrique Æquation.

In the Triangle D A N is given, (1) the Side D N 4047 (2) the Side D A 176, (3) the angle included A D N 135^{d} 37′ 34″, therefore to finde the angle D N A, and the Side A N, I ſay,

As the Summe of D N and D A 4223,	3,625621
To the Difference 3871;	3,587823
So the Tangent of 22^{d} 11′ 13″,	9,610475
To the Tangent of 20^{d} 29′ 51″:	9,572677

Difference 1 41 22 Angle D N A Optique Æquation.

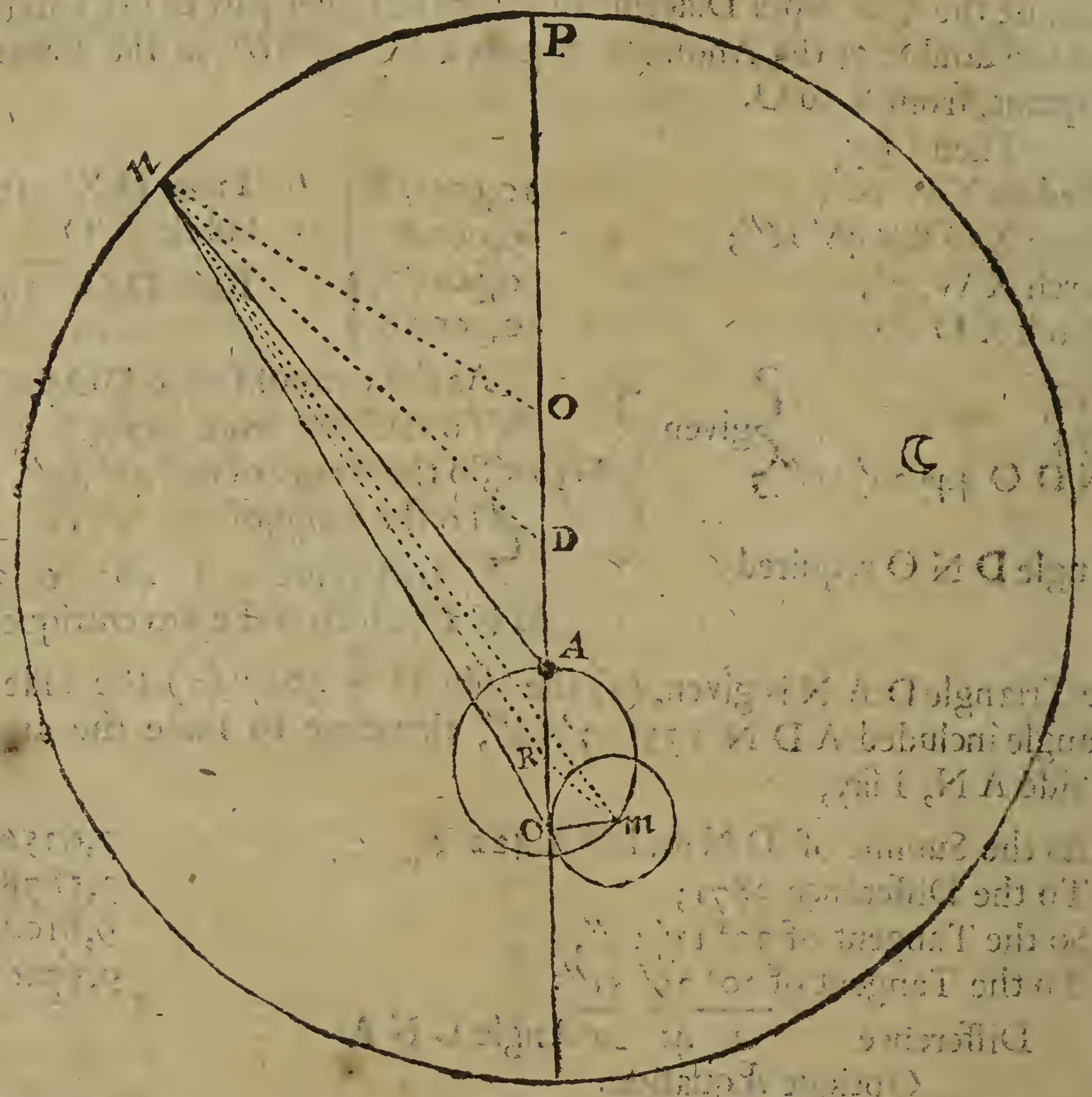
Sine of the angle D A N 42^{d} 41′ 4″,	9,831204
D N 4047;	3,607138
Sine of the angle A D N 135^{d} 37′ 34″,	9,844687
A N 4175:	3,620621

	D	′	″
Excentrique Æquation	1	46	36
Optique Æquation	1	41	22
Abſolute Æquation	3	27	58

	Sig.	D	′	″
Middle Motion of the Moon	3	1	3	3
Æquation Subſtract		3	27	58
Motion of the Moon æquated	2	27	35	5
Motion of the Sun Subſtract	5	4	5	47
Diſtance of the Moon from the Sun	9	23	29	18
Synodicall Anomalie	7	16	58	36
	1	12	14	4

Thus is the true place of the Moon obteined from A, the Center of the Earth, as in relation to her own Orbite, wherein ſhe keepeth her proper and uniforme courſe, by her ſelf about her own Umbilique point. But becauſe the whole Syſteme of the Moon is removed from the proper Seats, there ariſeth another Inæquality according to the Proportion of her diſtance from the Sun; for when ſhe is directly in the line which paſſeth thorow the Center of the Earth to the Sun, ſhe is then freed from this Inæquality, becauſe then the viſual line of her appearance, paſſeth through the Center of the ⊙, and falleth directly upon the Zodiacall Circle with right angles (as I ſaid before) which is both at the Conjunction and Oppoſition, but being in, or about her quarters, where ſhe is furtheſt removed from the ſaid Syzygiacall line, the angle of her Reflection is greateſt in reſpect of the emoved Syſteme from the naturall Seats of the other Planets, as before is ſhewed. Now to finde her Synodicall Æquation, I have ſet down the following Diagram and Operation.

Second Figure of the Moon.



An Inveſtigation of the Synodicall Æquation of the Moon.

In the premiſed Diagram we have in the Triangle R A N theſe three parts given.

1 The Side A N 4175.
2 The Side A R 88.
3 The angle R A N $137^{d}\ 18'\ 56''$.

Hence the other two angles A R N, and A N R, with the Side R N are to be ſought.

1

Summe A N and A R 4263,	3,629715
Difference 4087;	3,611405
Tangent $21^{d}\ 20'\ 32''$,	9,591840
Tangent 20 32 10:	9,573570

$$\left.\begin{array}{l}\text{Aggreg. } 41\ \ 52\ \ 42\\ \text{Dif. } \ \ 0\ \ 48\ \ 22\end{array}\right\}\text{angle}\left\{\begin{array}{l}ARN\\ ANR\end{array}\right\}\text{required.}\Big\}$$

2

Sine of angle A R N $41^{d}\ 52'\ 42''$,	9,824483
A N 4175;	3,620621
Sine of the angle R A N $137^{d}\ 18'\ 56''$;	9,831204
R N 4240:	3,627342

The Side demanded.

To the angle A R N $42^{d}\ 52'\ 42''$.
Adding the Angle A R M $133^{d}\ 1'\ 24''$.
Procreate the angle N R M $174^{d}\ 54'\ 11''$.

In the Triangle N R M is known.
1 R N 4240.
2 R M 88.
3 angle N R M 174^{d} 55′ 25″.

Hence, the other two angles and the 3 ſide N M are to be ſought.

Summe of R N and R M 4328,	3,636287
Difference 4152;	3,618257
Tangent 2^{d} 32′ 57″,	8,648562
Tangent 2 26 44:	8,630532
Aggreg. 4 59 41 } angle { R M N	
Dif. 0^{d} 6 13 } angle { R N M	
Sine of the angle R M N 4^{d} 59′ 41″,	8,939838
R N 4240;	3,627342
Sine of the angle N R M 174^{d} 54′ 6″,	8,948731
N M 4328 : *ferè.*	3,636235
The ſide required.	

Afterwards in the little Circle O L O, I compute the Synodicall Anomalie from L, by Y, to O, 226^{d} 58′ 36″, then in the Triangle N O M is known: (1) the ſide N M 4328: (2) the ſide M O 48: (3) the angle included O M N 46^{d} 58′ 36″.

Summe of the ſides 4376,	3,641077
Difference 4280;	3,631444
Tangent of 66^{d} 30′ 42″,	10,361939
Tangent of 66 2 37:	10,352306

Dif. 0 28 5. *viz.* angle M N O, which is the Synodicall variation.

To the angle A N M 0^{d} 42′ 9″.
A add angle M N O 0 28 5.
Abſolute Synod. Æquation 1 10 14.

Laſtly, to finde the Annuall variation. I ſay,

Anal.		
	As the mean diſtance of the Earth from the Sun 100000,	5,00000
	To the diſtance of the Earth at time of Obſervation 100910;	5,00393
	So the Synodicall Æquations at the mean diſtance 1^{d} 10′ 14″,	8,31023
	To the true Co-æquate Synodicall Æquation 1^{d} 10′ 52″	8,31416

	Sig.	D	′	″
Place of the Moon æquated.	2	27	35	5
Synodicall Æquation Subſtr.		1	10	52
Place of ☾ in her Orbite.	2	26	24	13
Reduction Subſtract.				56
True place of the ☾ in the Ecliptique.	2	26	23	17.

Agreeing to the exquiſite obſervation of that treſ-noble *Tycho Brahe*. And here I cannot omit to mention that notorious errour of *Ph. Lanſberg. Precept.* 7. *Calculi Motuum Cœleſt.* where he contends that the true place of the Moon, at the time of this memorable Animadverſion, was by the Inſtruments of *Tycho*, obſerved in 27^{d} 21′ Gemini, with South Latitude 5^{d} 13′, but not in 26^{d} 21′, or 26^{d} 23′, as *Tycho* ſets down *Lib.* 1. *Progymnaſ.* and *Longomont. pag.* 123. *Aſtron. Dan.* for ſaith *Lanſberge Fol.*34. *Precept.* 7. and *Fol.* 6. *Theoric. Mot. Cœleſt.* the Sun, according to *Tycho*, was in 4^{d} 5′ ♍, and his Right Aſcenſion 155^{d} 59′, to which if there be added 291^{d} 15′, for the meaſure of time 19^{h} 25′, it will give the Right Aſcenſion of the *Medium Cœli* 87^{d} 14′, which, with 5^{d} 13′ South Latitude, giveth in the Tables of *Regiomontaus*, the true place of the Moon in the Ecliptique, in 27^{d} 21′ ♊, ſo that thereby he would prove (though very ſimply) that *Tycho* failed in his obſervation, no leſſe then a whole deg. or 60′, but let us examine it thus.

	D	′
Places of the Sun according to *Tycho* ♍.	4	5
Right Aſcenſion of the Sun.	155	59
Diſtance of the Center of the Moon, Subſtr.	69	47
Right Aſcenſion of the Center of the Moon	86	12
The Circle Adde,	360	0
Aggregate	446	12
R: A: ☉ ——— Subſtr.	155	59
Reſts	290	13

Which 290^{d} 13′ being coverted into time, ſheweth the time of *Tycho's* Obſervation Ho. 19 21′, and if we enter the forementioned Tables of *Regiomont* under the Signe ♊ with 86^{d} 12′, and with South Latitude 5^{d} 14′, we ſhall finde it to point out in the Ecliptique 26^{d} 21′ ♊, which was the true place of the ☾ obſerved by *Tycho*, differing from that, which *Lanſberge* falſly wreſts to his purpoſe, a whole degree, but I ſhall at preſent omit to mention any more of his abſurdities, they that pleaſe may read *Phocylides* his *Examen Aſtronomiæ Lanſbergianæ*, where they may finde him ſufficiently Characteriz'd.

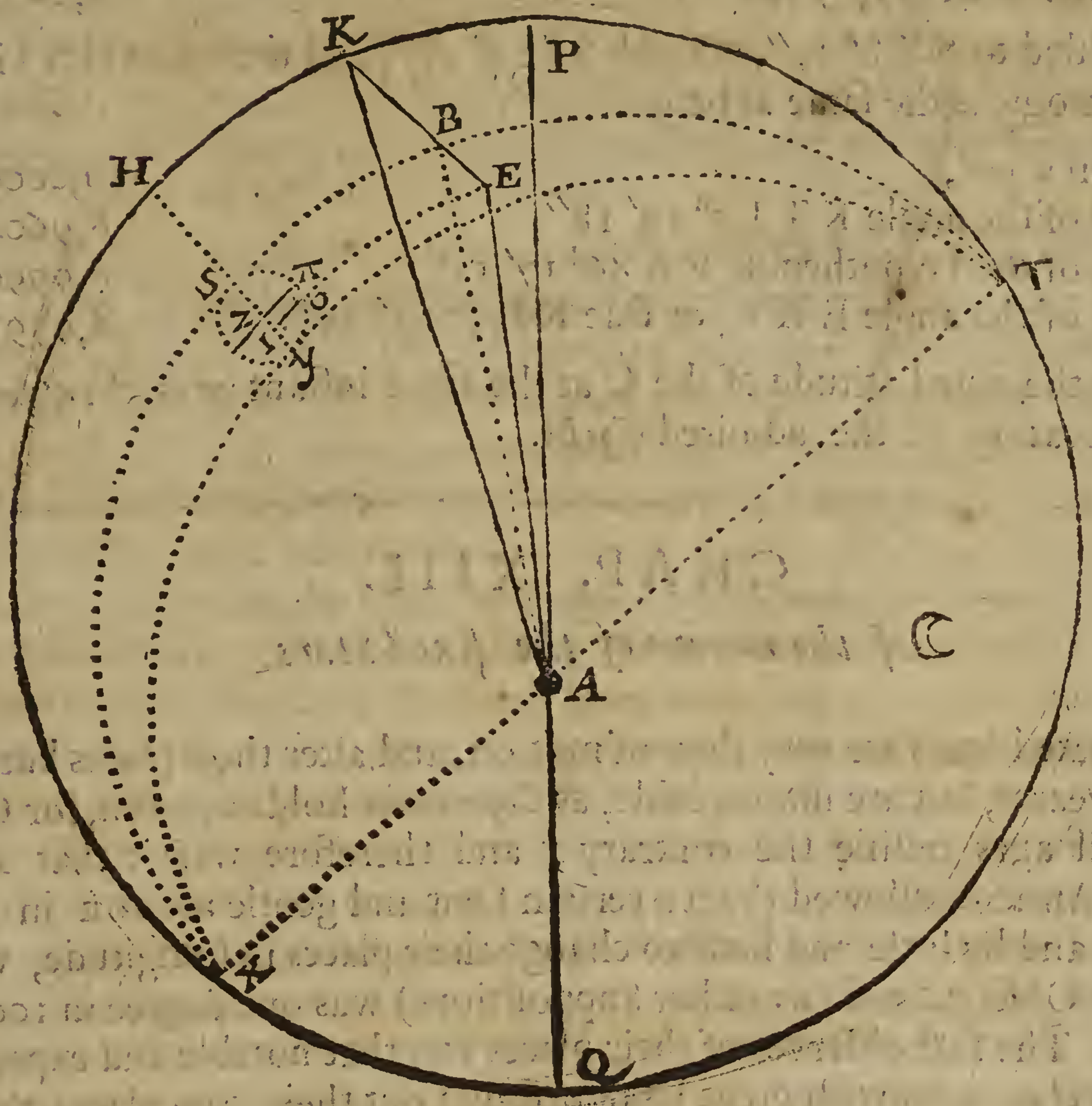
CHAP. XII.

Of the Latitude of the Moon.

THe ancient Aſtronomers (to whom *Copernicus* aſſents) were of opinion that the Latitude of the Moon, had onely dependance upon her Nodes, and were always of like magnitude & Quantity in places equally diſtant from the ſame, both at the time of her Conjunction, Oppoſition, and Quarters, but we finde by acurate Obſervations taken by *Tycho*, and others ſince his time, that her greateſt Latitude in her Quarters is more by 17′, for in the Conjunction and Oppoſition of the ☉ and ☾, the greateſt Obliquity of her Orbe, is always 5^{d} 0′, but in her Quarters 5^{d} 17′, which variation is alſo cauſed by the Emotion of the ☾ Syſteme from the proper Seat, as hath been ſaid before; but for the Inæquality of the motion of the Nodes, which *Tycho* and ſome of his followers do introduce, I ſee no reaſon for it, neither for the Tranſlation of the whole Syſteme of the Moon from the Center of the Earth, which *Bullialdus* admits of, his ſuppoſition being altogether againſt reaſon, and not depending upon ſufficient Principles, but I paſſe over theſe things, and haſten to practiſe.

When the Moon is in the Syzygiacall line, or line of the ☉, there is no Synodicall Æquation, but her greateſt Latitude is alwayes 5^{d} 0′, but being removed from the ſaid line, her Latitude encreaſeth by little and little till ſhe come to be 90^{d} diſtant from the ☉, which is her greateſt Elongation from the ſaid line, in which Poſition, her greateſt Latitude is 5^{d} 17′. So that the Exceſſe, or augmentation of her Latitude is 17′, as we ſhall here demonſtrate.

Third Figure of the Moon.



In the Diagram premiſed TKXP, repreſent the Orbe of the Moon, TSX the Plane of the Ecliptique, X, the Node Aſcending, T the Node diſcerting, H S the greateſt Latitude of the Moon in her Conjunctions, and Oppoſitions, $5^{d}\,0'$, and H Y, the greateſt Latitude in her Quarters $5^{d}\,17'$, the Exceſſe S Y, $17'$, and here you are to note that when ſhe is placed in either of her Nodes, (which are nothing but the Interſections of her Orbite with the Ecliptique) ſhe is void of Latitude, but departing from the ſame her Latitude augments, till ſhe commeth to the limits of her greateſt Latitude. Now ſuppoſe the ☾ being New, or Full be diſtant, from her Sorth Node T, $86^{d}\,17'\,15''$, and her Latitude be required, therefore I number the Argument of her Latitude from T, by P, to K, $86^{d}\,17'\,15''$, and from thence, let fall the Perpendicular K B, upon T B, the Ecliptique, with Right angles; then in the Sphæricall Rectangle Triangle T B K, we have known: (1) the Side or Hypothenuſe T K $86^{d}\,17'\,15''$: (2) the angle K T B $5^{d}\,0'$: Hence, the Side B K, or angle B A K, which is the angle of her Latitude, may be obteined.

Anal.	Radius 90^{d},	10,000000
	Angle K T B $5^{d}\,0'$;	8,940296
	Hypothenuſe T K $86^{d}\,17'\,15''$,	9,999087
	Sine B K $4^{d}\,59'\,22''$:	8,939383
	Or angle of her Latitude B A K.	

When ſhe is Extraſyzygiacall,

Anno 1587, Auguſt 17. Ho. 18 $32'\,36''$ (in our Meridian) being the time beforementioned, *Tycho* obſerved the true Latitude of the ☾, to be $5^{d}\,14'$ South, at which time her Synodicall Anomalie is $226^{d}\,58'\,36''$: Likewiſe the greateſt Latitude of the Moon new or full, underſtood by the angle H T S, is $5^{d}\,0'$, and her greateſt Latitude, when ſhe is in her Quarters, ſhewed by the angle H T Y, is $5^{d}\,17'$, the halfe difference S Z is $8'\,30''$, with which Intervall on the Center Z, is deſcribed a little Circle, noted with S O Y S, wherein I number the Synodicall Anomalie, from S (by Y) to O $226^{d}\,58'\,36''$, and becauſe its greater then 180^{d}, and leſſe then 270^{d}, I deduct it from 270, and there remains o π $43^{d}\,1'\,24''$, then the Analogie is,

As the Radius Z Y 90^{d},	10,000000
To the Sine Z I $43^{d}\,1'\,24''$;	9,833973
So the Arch Z Y $8'\,30''$,	7,393145
To the Arch Z I, $5'\,48''$:	7,227118

Which added to S Z $8'\,30''$, maketh S I $14'\,18''$, and therefore H S I is $5^{d}\,14'\,18''$ then the Analogie is the ſame as before.

Radius 90^{d},	10,000000
Sine of the angle K T I $5^{d}\,14'\,18''$;	8,960470
Sine of the Hypothenuſe P K $86^{d}\,17'\,15''$,	9,999087
Sine of the angle E A K, or ſide K E $5^{d}\,13'\,39''$:	8,959557

Therefore the true Latitude of the ☾ at the ſame inſtant was $5^{d}\,14'$ *ferè*, agreeing to the Obſervation of the admired *Tycho*.

CHAP. XIII.

Of the motion of the fixed Stars.

THe fixed Stars are very ſlow of motion, and alter their places but little in many yeares, but are immoveable, as *Copernicus* holds opinion, for Obſervations in all ages teſtifie the contrary, and therefore was it that *Ptolomie* and the Ancients allowed them a certain Lent and gentle motion in conſequence of the Signs, and by little and little to change their places in Longitude, which according to their Obſervations (or rather Suppoſitions) was one degree in 100 yeares, or thereabouts. The firſt obſerver of their places was that notable and expert Mathematician *Hypparchus*, who with great labour, found out their true places, and compoſed new Tables of their motions.

After him followed *Ptolomie*, who in ſome things corrected the Catalogue of his prædeceſſor *Hypparchus*, and changed ſome of their names, as he witneſſeth, *Lib.* 7 *Cap.* 4. *Almageſti*, where he alledgeth ſeverall reaſons for his ſo doing.

About 740 years after flouriſhed *Albategnius*, in all which time, namely from *Ptolomie* to *Albategnius*, there is none known, that obſerved the fixed Stars and their motions, but the laſt age produced more admirable and rare diſcoveries then any had done before; to paſſe by the worthy *Copernicus*, *Walther*, *Vernerus*, and the magnificent Prince, the Lantgrave of *Haſſia*, all who made many admirable Obſervations, yet at length appeared that noble man of *Denmarke*, *Tycho Brahe*, who to the glory of Art, put a Crown upon the work, inſomuch that by his incredible pains, and vaſt expence of Treaſure, he by his admired obſervations, compiled that acurate Catalogue of the fixed Stars, which next to the motion of the Sun, is the beſt foundation to reſtore Aſtronomie.

To paſſe by the *Chimera's* of *Alphonſus* and others, and the abſurd ſuppoſition of *Thebeth Ben-Core* (who attributeth to the fixed Stars a motion, ſometime in conſequence, and ſometime in antecedence of the Signes) I next come to *Copernicus*, who admitteth of an inæquality of motion in the fixed Stars, and though taking away thoſe abſurdities of their going backward, yet neverthleſſe falleth (in my opinion) into another almoſt as bad, for he would have the Poles of the Earth to wheel about the Poles of the Zodiaque in the ſpace of 25816 Egyptian years, whereby the motion of the fixed may ſometime be augmented, and ſometime again diminiſhed, from which Inæquality ariſeth the inæquall motion of the Præceſſion of the Equinoctiall, and of the motion of the Planets and Stars, which *Copernicus* introduceth.

But the late learned and worthy Frenchman, *Iſmael Bullialdus* diſſents from *Copernicus*, who maketh the motion of the Stars inæquall, by the receſſe of the Equinoctiall Points in antecedence, and by the turbination of the Poles of the Earth: againſt which inæquality, *Bullialdus Lib.* 5 *Cap.* 2. giveth ſeverall Reaſons, ſome whereof I ſhall here give you. (ſaith he)

" Firſt, there are no obſervations of the ancient Aſtronomers, that exactly deter-

,, mines the places of the fixed Stars, and there having ſo bad a foundation, it
,, would be meer raſhneſſe in any, to build up any ſuch fabrick of turbination.

,, Secondly, No Circular Revolution in the Heavens throughout its whole Cir-
,, cumference, doth admit of more Inæqualities then one, where in the own ſemi-
,, circle the motion is retarded, in the other encreaſed : but admitting of this Inæ-
,, quality, (which *Copernicus* attributes,) the ſimple motion is almoſt fifteen times in-
,, tended and remitted, but in other Revolutions intended but once and remitted no
,, oftner.

,, Thirdly, ſo ſmall a difference of the motions of the fixed Stars is there found
,, in diſtinct Intervalls of time, that it cannot be attributed to any true and naturall
,, motion, but with great boldneſſe and temerity, whereby too unadviſedly, we fa-
,, ſten upon the Heavens, the fictions of our own frail and imperfect Intellect.

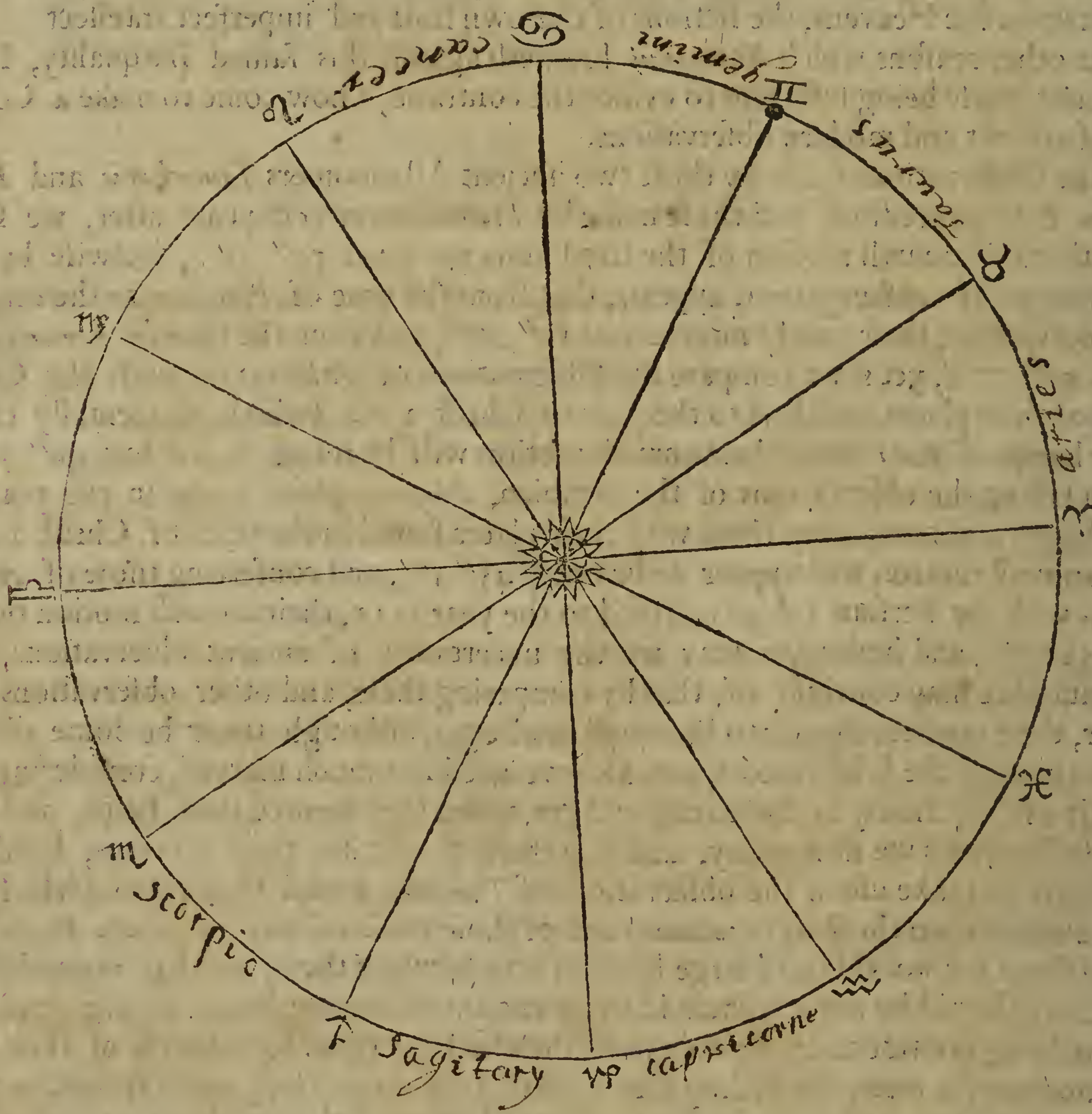
The other reaſons which *Bullialdus* bringeth againſt this fained Inæquality, I do here omit, theſe being ſufficient to evince the contrarie, I now come to make a Collation of ancient and modern obſervations.

If the Obſervations made by thoſe two ancient Aſtronomers *Timocharis* and *Hipparchus* may be credited, and thoſe made by *Ptolomie* neer 300 years after, we ſhall finde that the annuall motion of the fixed Stars was then 52″ 32‴, likewiſe by the obſervations of *Albategnius* it appears, that from the time of *Ptolomie* to the time of his obſervations, their yearly motion was 50″ 26‴, and from the time of *Ptolomie* to *Tycho* 50″ 37‴, yet if we compare the Obſervations of *Albategnius* with the Catalogue of their places rectified to the year of Chriſt 1364 (which accidentally came to the hands of *Bullialdus*) their annuall motion will be found to be but 48″ 52‴. Again taking the obſervations of the Arabian, *Ebennezophim*, made in the year of Chriſt 937, and comparing them with their places found in the year of Chriſt 1364, their annuall motion will appear to be onely 45″ 5‴, and conferring thoſe of *Albategnius* with the Perſian Tables rectified to the year 1115, their annuall motion ought to be 52″ 7‴, and hence we may ſee the uncertainty of ancient obſervations, yet thus much we may conclude of, that by comparing theſe, and other obſervations together, their motions appear to be equall in all ages, although there be ſome diſcrepancy amongſt the Obſervators, at which we need not much marvell, conſidering the infancie of Aſtronomy in thoſe remote Ages, when they wanted thoſe helps, and curious Inſtruments we now enjoy, and therefore to rectifie their motions, I hold it moſt meet to make uſe of the obſervations of *Tymocharis* and *Hypparchus* (which are more ancient then thoſe of *Ptolomie*) and of thoſe made of late by *Tycho Brahe*, in regard there is a notable and large ſpace of time between them, ſo that notwithſtanding there ſhould be ſome fallacie in thoſe ancient Animadverſions, yet the Intervall of time being conſiderable, we may neverthelеſſe lay a good foundation of their annual motions for many ſuceeeding Centenaries, neither can I vary much from that proportion that *Tycho* and *Bullialdus* have alotted before me, being about 50″ $\frac{1}{3}$, which quantity I retein, as moſt agreeable to Truth and Obſervation.

The motion of the fixed Stars being by obſervation found to be equall, it follows then; that the Points both of the middle and true motion (which are called Umbilique Points) muſt needs be united and fall together in the very Center of the Orbe, as you may behold in the following Figure, ſo that the Orbe of the fixed Stars is not excentricall, but concentricall to the Sun.

But the variation of the Latitude of the fixed Starres is not ſo perceptable and eaſie to be diſcovered, and found out, as their Longitude, in regard there is no ſenſible variation in many hundred years, yea if wee confer the obſervations of *Tycho*, with thoſe taken by *Ptolomie* 1500 years ſince we may in ſome Obſervations finde a little difference, but a contradiction in others, ſo that we can gather nothing from the help of former obſervations to be ſufficient, whereupon to eſtabliſh and rectifie this mutation of their Latitudes, when as they ſeldome took their places neerer then to the fourth part of a degree nay many times failed a degree from truth, and then if we do but conſider the ſmall difference of mutation, which is found in diſtinct Intervalls of time, it will appear but meer raſhneſſe and preſumption in any that ſhall attempt to make a reſtitution of this variation of their Latitudes ; for my part I conceive the Revolution and Period thereof, cannot be foreſeen by man, but is onely known to God alone, yet thus much I may adde, that ſo many fixed Stars as there are in number, ſo many ſeverall Latitudes and Inclinations have they, which queſtionleſſe vary, and are of the ſame quality and nature with thoſe of the inferiour Orbes, though differ much in quantity and proportion. It being then ſuperfluous to adde any Theorie of their particular Deviations from the Ecliptique Orbe, I ſhall onely content my ſelf with thoſe Obſervations made in our age by the never to be forgotten *Tycho Brahe*, and therefore I refer the Reader to his Catalogue of their places, which I have inſerted in its proper place.

A Figure of their motions in Longitude.



CHAP. XIV.

Of the Theorie and motions of the three ſuperiour Planets, Saturne, Jupiter, *and* Mars.

1 THe reaſon why we call the three Planets ♄ ♃ and ♂ (in this new forme of Aſtronomy) Superiours, is becauſe they are placed above, or without the great Orbe of the Earth, as ♀ and ☿ are called Inferiours, becauſe they are placed under, or within the Orbe of the Earth towards the Center, that is to ſay between the Earth and the Sun, who is the Center of the whole Planetarie Syſteme.

2 Theſe three Planets (contrarie to the motion of the Earth) are uſually accounted to have a twofold, or double motion, the one of Longitude, the other of Latitude, for as the way of the ☉ (for ſo I it call in repect of the vulgar opinion) is oblique to the Equator, ſo are the ways of theſe Planets oblique to the way of the ☉, therefore in its proper place I ſhall deſcribe their motion in Longitude, with the inclinations of

their Orbits from the Ecliptique, beginning firſt with their motions, as in reſpect of Longitude, which is in conſequence of the Signes *ab occaſu in Ortum*, or from Weſt to Eaſt. And whereas to us that live upon the ſurface of the Earth, their motions appear very unequall and irregular, being to the eye ſometime direct, ſometime retrograde, and ſometime ſtationarie; therefore to ſalve the Phenomena, the ancient Aſtronomers, ignorant of the Earths motion, were forced to deviſe other helps, for beſides the Excentrique motion, they imagined each Star had alſo a peculiar motion in an Epicycle, whoſe Center they ſuppoſed to be carried in the Circumference of the Excentrique, and ſo by help of a multiplicity of Circles and contrary motions (though altogether againſt reaſon and nature) they came ſomewhat neer to diſcover the Phenomenan, as may appear by *Ptolomie Lib.* 3. 4. 5, *&c. Almageſti*, *Turbachius in Lib. Theoricarum*, *Mæſlin Epit. Aſtron.* *Reinhold in Theoricas Purbach. Argol. in Pand. Sphæric.* and in innumerable other Authours, whoſe Works are extant; but after the learned *Copernicus* had begun to diſcover the truth, comes that worthy Luminarie *Kepler*, who utterly rejected the fained ſuppoſitions of his Prædeceſſors, and taught truth to move in her own Orbe, ſince whom by the aſſiſtance of later Obſervations, the Radient beams of truth it ſelf are more reſplendent, as appears to thoſe, who are converſant in Cœleſtiall Obſervations.

3 The Aphelion of a Planet is that point of the Orbite, wherein a Planet being is furtheſt diſtant from the ☉, and Center of the World, and is then ſloweſt in motion, inſomuch that from this point the diſtance of a Planet is reckoned, to finde thereby the Inæquality of his motion, ſo that the Arch or diſtance of a Planet from this point, is called the Anomalie of the Orbite, whoſe uſe is afterwards ſhewed.

4 Theſe three ſuperiour Planets ♄ ♃ and ♂ are each of them moved in their peculiar Orbites from Weſt to Eaſt, equally about the Center of the Circle equant, making their ſeverall Revolutions as followeth.

	Years	D.	Ho.	′
♄	29	174	4	58
♃	11	317	14	49
♂	1	321	23	32.

5 The Center of the Equant is a point in the line of the Auge or Aphelion, namely between the ſaid Auge, and the Center of the Excentrique being exactly diſtant ſo far from the Center of the Excentrique towards the Aphelion, as the ☉ is from the ſaid Center the Perihelion, as in the following Figure P Q is the line of the Auges, D, the Center of the Excentrique, A, the place of the ☉, and X the Center of the Equant, which laſt two points are alike diſtant from D, the Center of the Orbite.

6 The Orbite of a Planet is an Elliptique Circle, wherein the Planet keeps his conſtant courſe and motion, though with ſome Inæquality, becauſe the converſions of their Orbites are obſerved not to be æquated to their own Centers, but to the Center of the Circle Equant, which point is marked in the following Figure with the letter X, the Semidiameter and motion thereof being equal to the Semidiameter and motion of the Epicycle.

7 Upon the Center Equant is deſcribed the Circle Equant, whoſe circumference is noted with the letters V W V, which ſerveth chiefly to finde the variation of the firſt Inæquality, for in the Diameter thereof V X W is numbred the variation from the Center X, (which is the point of æquality) upwards towards V, when a Planet is Infra Diacentron, but on the contrary, it is accounted downwards when a Planet is Supra Diacentron, the motion thereof being double to the motion of the Planet in his Orbite.

8 Becauſe the Center of the Equant is towards the Aphelion, or Auge of the Excentrique, it neceſſarily followeth that a Planet moveth more ſlowly when he is Supra Diacentron, or in the upper part of his Orbite, and more ſwift when he is Infra Diacentron, or in the nether part thereof, for a leſſer part of the Orbite belongeth to the upper part of the Circle Equant, and a greater part is due to the nether part thereof, as the following Figure plainly demonſtrates.

9 Upon the point D, is deſcribed the Excentrique, which is a pricked Circle, whoſe Circumference ſerves to carry the Center of the Epicycle, marked with the let-

ter Z, in the Perimeter of which Epicycle is numbred the double of the Anomalie æquated from L, which ſerveth to finde out the true place of a Planet in his Elliptique, and his diſtance from the Sun, for when a Planet is either in his Auge, or oppoſite Auge he is found in the point L, but when he is Diacentron he is in the point N, and is then neereſt the Center of his Excentrique.

10 The Excentrique place of a Planet is ſhewed by a right line drawn from D the Center of the Orbite, to the place of the Planet, as in the third Figure following is ſhewed by the line D N, ſo that the Æquation of the Excentrique is the angle D N O being equall to the angle T N R.

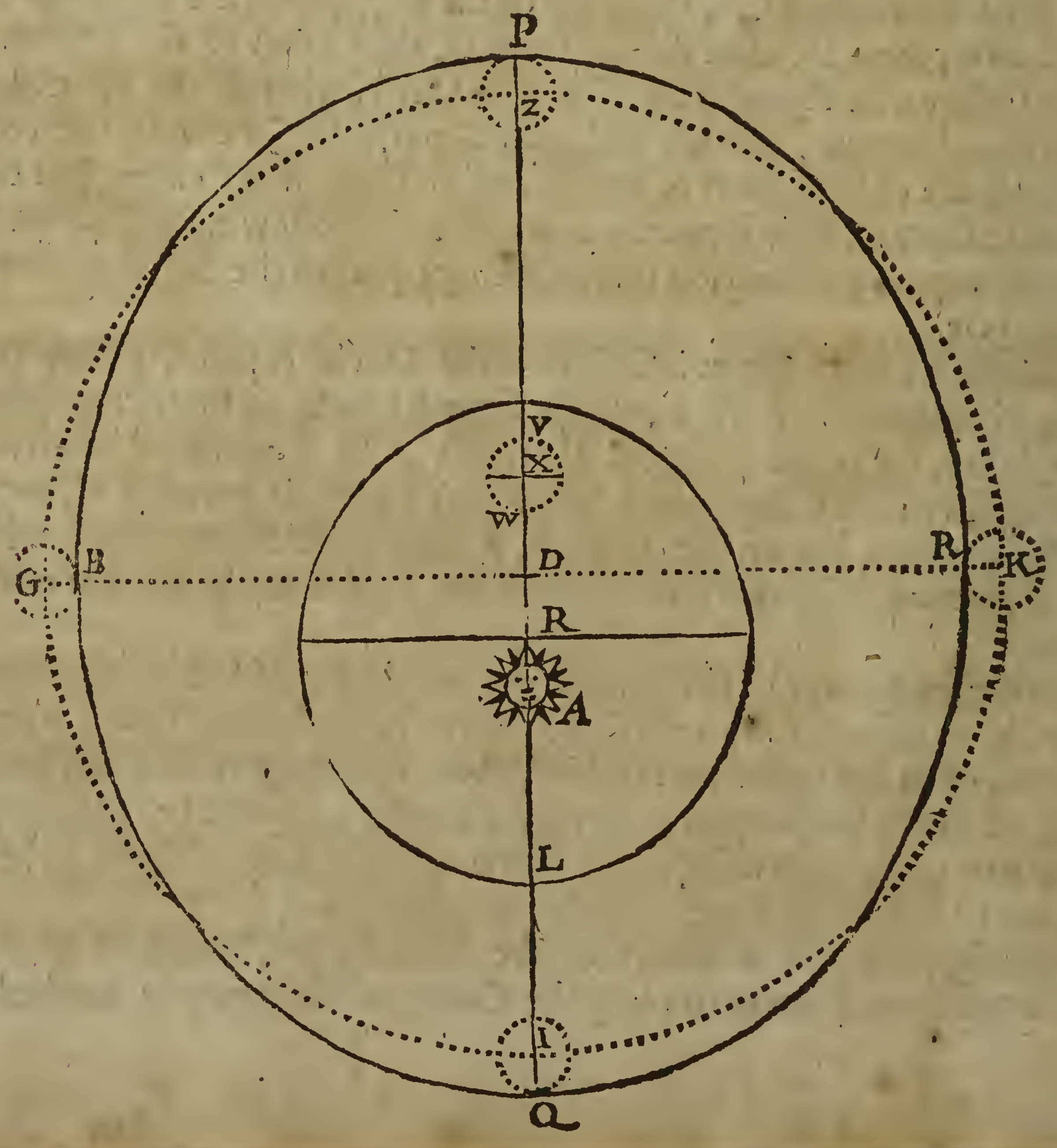
11 The place of a Planet from the Sun is ſhewed by a right line drawn from A the Suns place, through N the Planet to the Ecliptique, as in the ſaid third Figure following is repreſented by the line A N, ſo that the Optique Æquation is equall to the angle A N D.

12 To finde the Excentrique æquation their muſt be known, (1) the motion of the Aphelion, (2) the diſtance of a Planet from his Aphelion, (3) the quantity of the bi-ſected Excentricity; the ſame are alſo given, to finde the Optique Æquation, onely that part of the bi-ſected excentricity conteined between the Center of the Excentrique and the body of the Sun, whereas in finding the Excentrique æquation that part is uſed which is comprehended between the Center of the Circle Excentrique, and the Center of the Equant, being corrected by the variation thereof.

13 The abſolute Æquation is the Aggregate or Summe of the Excentrique and Optique Æquations, and therefore we call it the Compound and Abſolute Æquation, or Proſthaphæreſis of the Orbite.

14 In regard the Earth is one of the Planets, and is placed far without the Center of the World, it from thence followeth, that the true place of a Planet from the Earth, is ſhewed by the viſuall line paſſing from the Center of the Earth, through the body of the Planet to the Ecliptique, ſo that the Angle of this ſecond Inæquality is to be underſtood in the third Figure following, by the Angle A N S, which Angle is leaſt in Saturn, greater in Jupiter, and greateſt of all in Mars, which is cauſed by their unequall diſtances from the Earth.

15 To compute the true place of a Planet from the Earth, the Parallax of the Earths Orbe is to be known, to finde which theſe three parts are to be given, (1) the Diſtance of a Planet from the Earth, (2) the Diſtance of the Earth from the Sun, (3) the angle included, which is the Diſtance between the place of the Earth, and place of a Planet from the Sun.



In the premiſed Scheme, the outermoſt Ellipſis repreſents the Orbite of ♄ ♃ or ♂, whoſe Center is marked with the letter D, and the Diametrall line of the Auges, with the letters P D Q, paſſing from P the place of the Aphelion, to Q the place of the Perihelion, which line exactly bi-ſects the Orbite into two ſemicircles, equall in the Quantity and Celerity of the ſame parts.

The innermoſt Ellipſis marked with the letters S Y L T, is the Orbite of the Earth, the Center whereof is noted with R, by which the Diametient line paſſeth from S, the Aphelion, to L, the Perihelion.

A Table of the particular Dimenſions of the ſeverall Orbites of Saturn, Jupiter, Mars, and the Earth.

	♄	♃	♂	Earth
Semidiameter of the Circle D Z or D G.	952500	522000	152040	100000
Semidiameter of the Epicycle Z P, or B G.	790	320	460	16
W^{ch} equalizeth XV, or XW in the Equant	790	320	460	16
Bi-ſected Excentricity D X, or D A.	54800	25230	14105	1787
In the Ellipſis.				
Aphel. Semidiametient D P equal to D Q.	953290	522320	152500	100016
Diacentron Semidiametient D B, or D R.	951710	521680	151580	99984

16 The Nodes are two Points in which the Plane of the Ecliptique interſects the Orbite of the Planet in places oppoſite by the Center of the Sun, as in the third figure following, where T E K repreſents the Plane of the Orbite, and T X K the Plane of the Ecliptique, which interſect each other in the points T, and K, oppoſite by A, the Center of the ☉.

17 The Argument of Inclination is an Arch of the Orbite intercepted between the Node Aſcending, and the place of a Planet from the Sun, being numbred in conſequence of the Signes, as in the third figure following, K is the Node Aſcending, L the place of the Planet, therefore K L is called the Argument of Inclination.

18 The Circle of Inclination is a great Circle about the Sun in the Sphære of the fixed, falling right upon the Ecliptique.

19 The Inclination of a Planet is an Arch of the Circle of Inclination comprehended between the Ecliptique and the Center of a Planet in his Orbite, repreſented in the forementioned Diagram by the Arch X L, which is greateſt, when a Planet is 90^{d} diſtant from his Nodes, being then in the limits of his greateſt Latitude B E, and here note, that the greateſt Inclination is in ♄ 41680, in ♃ 12424, and in ♂ 496.

20 The excentrique place of a Planet in the Ecliptique is that very point of the Orbite, whereon the Circle of Inclination comming from the place of a Planet in his Orbite, falls thereon with right Angles, as in the forementioned Diagram, L is the place of the Planet in his Orbite, from which the Circle of Inclination paſſeth, and falls upon the Ecliptique at X with Right angles, ſo that X is the excentrique place of the Planet in the Ecliptique.

21 The Reduction is nothing but the Differerence between the Argument of Inclination and the excentricall Longitude, that is to ſay, the Difference of the two Arches of Orbite, and the Ecliptique, intercepted between the Node and the Circle of Inclinations, as in the third Scheme following, where it is underſtood by the Difference between K L and K X.

22 The Curtation of a Planet is a little part cut off from the line of his Intervall or diſtance from the Sun, agreeing to the Sagit of Inclination, as in the forementioned Figure A L is the diſtance, or Intervall given, A O the Diſtance Curtated, and therefore O L is the Curtation it ſelf.

23 The Latitude of a Planet is an Arch of the Circle of Latitude, intercepted between the Ecliptique and the apparent place of a Planet, or it may better be underſtood in the forementioned Figure by the angle L S X, which is the angle it ſelf of the apparent Latitude.

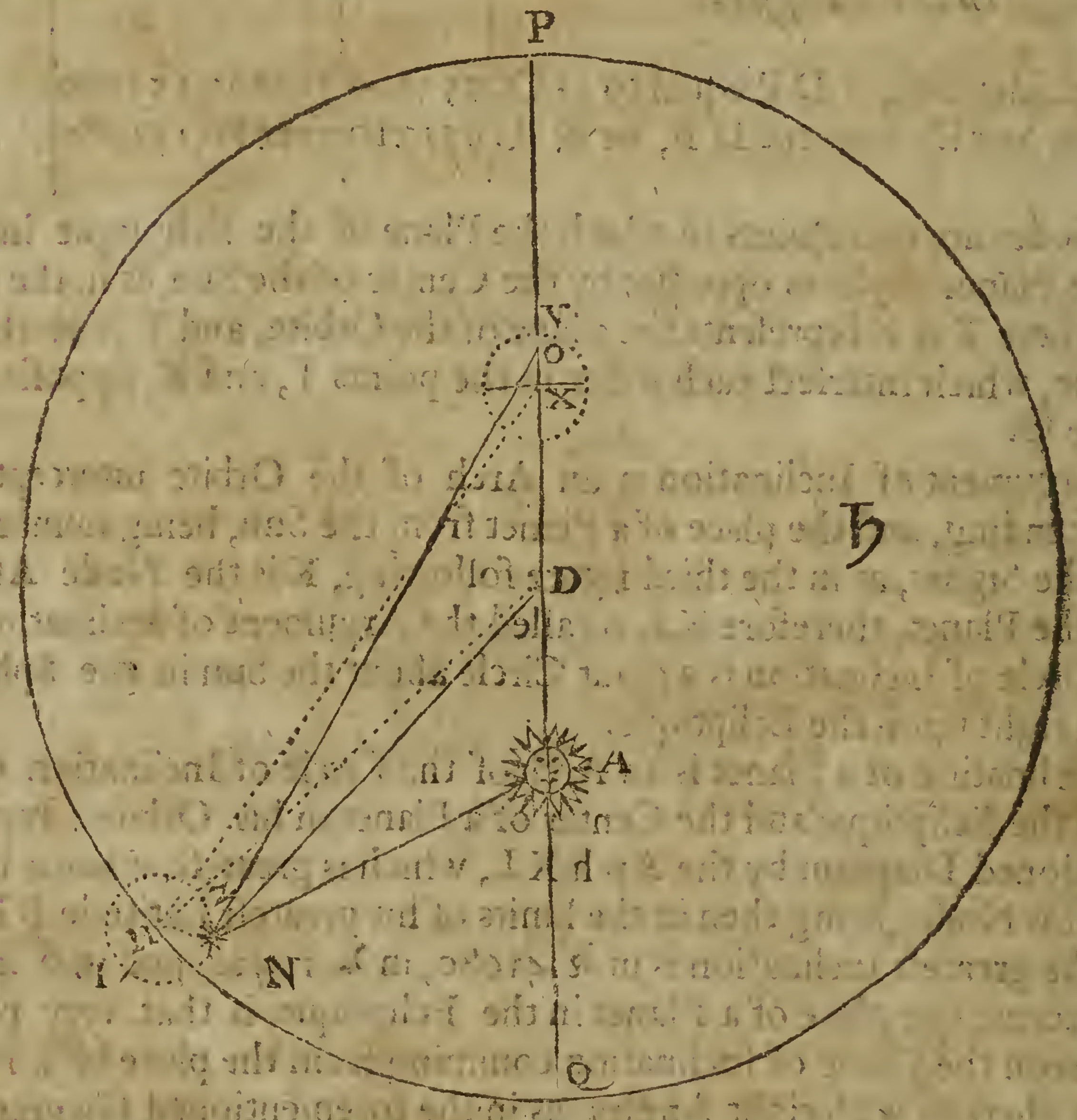
CHAP. XV.

A Geometricall Demonſtration of the true motion of Saturn, Jupiter, *and* Mars; *according to the Doctrine of Trigonometrie.*

ANno 1587 January 15 at 4^{ho} 55′ (*Meridiano Londinenſi*) noble *Tycho* obſerved in ♄ in 26^d 24′ ♈, having 2^d 25′ South Latitude, at which time is given,

	S	D	′	″
The true place of the ☉.	10	5	22	21
The Diſtance of ☉ from the Earth.		98455		
Middle motion of ♄.	1	7	37	41
Aphelion of ♄.	8	25	41	19
Node Aſcend. ♄.	3	20	24	5
Aomalie of ♄.	4	11	56	22.

Firſt Figure of Saturn.



A Synopſis of the Calculation.

In the Excentrique Circle, P H Q P, I compute the Anomalie of the Excentrique from P, the Aphelion, to H, 131^d 56′ 22″, whoſe Complement is the angle D X H 48^d 3′ 38″, which given, we have in the Triangle D X H, two other parts, namely D H 952500, and D X 54800. Hence the angle D H X will be found to be 2^d 27′ 10″ for,

As the Side D H 952500,	5,978865
To the Sine of the angle D X H 48^d 3′ 38″;	9,871486
So the Side DX 54800,	4,738781
To the of the angle D H X 2^d 27′ 10″:	8,631402

Simple Anomalie P X H.	131^d	56′	22″
Angle D H X; Subſtr.	2	27	10
Reſts Anomalie æquated.	129	29	12
Motion of the Epicycle I H N	258	58	24.

In the Triangle D H N.

I

Summe of D H, and H N 953290,	5,979225
Difference 951710;	5,978505
Tangent of 50ᵈ 30′ 48″	10,084102
Tangent of 50 28 0;	10,083382

Aggregate, 100 58 48. *viz.* Angle H N D.
Difference. 0 2 48. *viz.* Angle H D N.

II

Sine of the angle H N D 100ᵈ 58′ 48″,	9,991976
Side D H 952500;	5,978865
Sine of the angle N H D 78ᵈ 58′ 24″,	9,991906
Side D N 952346:	5,978795

	D	′	″
Anomalie Æquated P D H.	129	29	12
Angle H D N, Adde,		2	48
Co-æquate Anomalie P D N.	129	32	0

In this Example ♄ is Infra-Diacentron, therefore I reckon 78ᵈ 58′ 24″ (being equall to the Angle Z H N in the Epicycle) in the upper Semicircle of the Equant from X towards V, *viz.* to the point O.

Then say,

As the Radius X V 90ᵈ,	10,000000	To D X	54800
To the Sine X O 78ᵈ 58′ 24″;	9,991907	Adde X O	775
So the Arch X V 790,	2,897627	D O	55575
To the Arch X O 775:	2,889534		

In the Triangle D N O.

D N 952346
D O 55575
Angle N D O 129ᵈ 32′ 0″ } given.

As the Sum of DN & DO 1007921,	5,003426
To the Difference 896771;	4,952681
So the Tangent of 25ᵈ 14′ 0″,	9,673274
To the Tangent of 22 44 55	9,622529

Angle D N O required. Difference 2 29 5 *viz.* Angle D N O, which is the Excentrique Æquation.

Then in the Triangle D A N is given, (1) the Side D N, 952346, (2) the ſide D A 54800, (3) the angle included A D N 50ᵈ 28′ 0″, then to finde the Angle D N A, and the ſide A N, I ſay,

As the Sum of DN & DA 167146,	5,003093
To the Difference 897546;	4,953054
So the Tangent of 64ᵈ 46′ 0″,	10,326725
To the Tangent of 62 7 44:	10,276686

Dif. 2 38 16. *viz.* Angle D N A, which is the Optique Æquation.

Sine of the angle D A N 126ᵈ 53′ 44″,	9,902943
Side D N 952346;	5,978795
Sine of the angle A D N 129ᵈ 32′ 0″,	9,887193
Side A N 918427:	5,963045

	D	′	″
Excentrique Æquation.	2	29	5
Optique Æquation.	2	38	16
Abſolute Æquation.	5	7	21.

	S	D	′	″
Middle Motion of ♄.	1	7	37	41
Æquation Subſtract.		5	7	21
Motion of ♄ from ☉ in his Orbite.	1	2	30	20.
Node Aſcend. of ♄ Subſtract.	3	20	24	5
Argument of Inclination.	9	12	6	15
Whoſe Complement to the Circle is	2	17	53	45.

To Calculate the Reduction, I ſay,

As the Radius 90^{d},	10,000000
To the Co-ſine of the greateſt Inclination of ♄ $2^{d}\ 30'\ 30''$;	9,999584
So the Tangent of the Compl.of his Inclination $77^{d}\ 53'\ 45''$,	10,668658
To the Tangent of the Argument reduced $77^{d}\ 53'\ 3''$:	10,668242

Whoſe difference $0'\ 42''$ is the Reduction required. And here note that the greateſt Reduction of ♄ is $1'\ 41''$, which happeneth when he is 45^{d} diſtant from his Node; therefore (doubling the Argument of Inclination) the Analogie may be thus.

As the Radius 90^{d},	10,000000
To the greateſt Reduction $1'\ 41''$;	6,689714
So the Sine of $24^{d}\ 6'\ 15''$,	9,612843
To the Reduction required $42''$, as before:	6,302557

Note,

If a Planet depart or move from either Node towards the Limits of his greateſt Latitude, the Reduction is to be ſubſtracted from the place found in the Orbite, but if he depart from the Limits, and approach towards the Nodes, the Reduction is to be added, for ſo the Summe or difference will be the place in the Ecliptique.

As in our Example ♄ is paſt the Limit of his greateſt Latitude, and is approaching towards his Node, therefore the Reduction is to be added.

	S	D	′	″
Place of ♄ from ☉ in his Orbite.	1	2	30	20
Reduction Adde.				42
Place of ♄ from ☉ in the Ecliptique.	1	2	31	2
Which deducted from the ☉ place.	10	5	22	21
Leaveth the Anomalie of Commutation.	9	2	51	19

To finde the Inclination of his Orbite from the Ecliptique, repreſented in the ſecond Figure following by the line X L.

In the Sphæricall Triangle X K L, is given, (1) the Hypothenuſe X L, the Argument of Inclination $77^{d}\ 53'\ 45''$, (2) the greateſt Inclination E B 41680 (underſtood by the angle X K L) then the Proportion is.

As the Radius K E 90^{d},	10,000000
To the greateſt Inclination E B 41680;	4,619928
So the Sine of K L $77^{d}\ 53'\ 45''$,	9,990236
To the Side X L 40753:	4,610164

Which is the Inclination agreeing to the Common Radius 952500, but whereas the diſtance of ♄ from the ☉ 918427, is to be put for the Radius, X L will be but 39296. For,

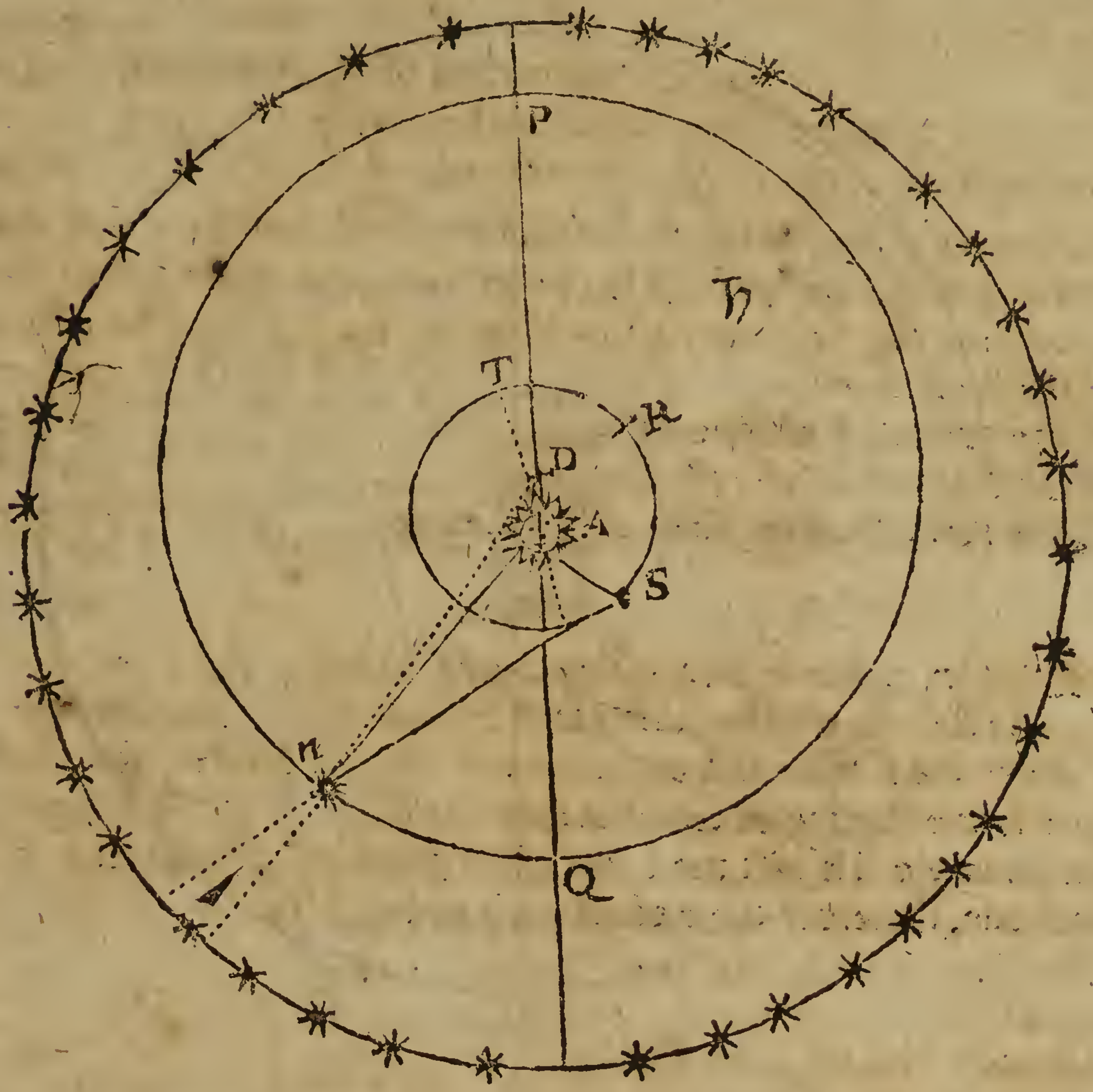
As D L 952500,	5,978865
To A L 918427;	5,963045
So L X 40753,	4,610164
To L X 39296:	4,594344

The Diſtance of ♄ in his Orbite from the Sun being given, with the Inclination of his Orbite from the Ecliptique, the Diſtance corrected by Curtation may thus be found.

In the ſecond Figure following.

Hypothenuſe A L 918427	Summe	957723	——	5,981239
Inclination X L 39296	Difference	879131	——	5,944053
	Aggregate			11,925292
Diſtance of ♄ Curtated A X 917585.	Semiaggregate			5,962646.

Second Figure of Jupiter.



Of the ſecond Inaquality of Saturn, *ariſing from the Annuall motion of the Earth.*

At the time of this Obſervation the true place of the Sun from the Earth is 10ˢ 5ᵈ 22′ 21″, and his Diſtance from the Earth 98455, which known, we have in the Triangle A N S of the premiſed Diagram three parts given.

1 A N 917585 }
2 A S 98455 } given.
3 Angle N A S 92ᵈ 51′ 19″ }

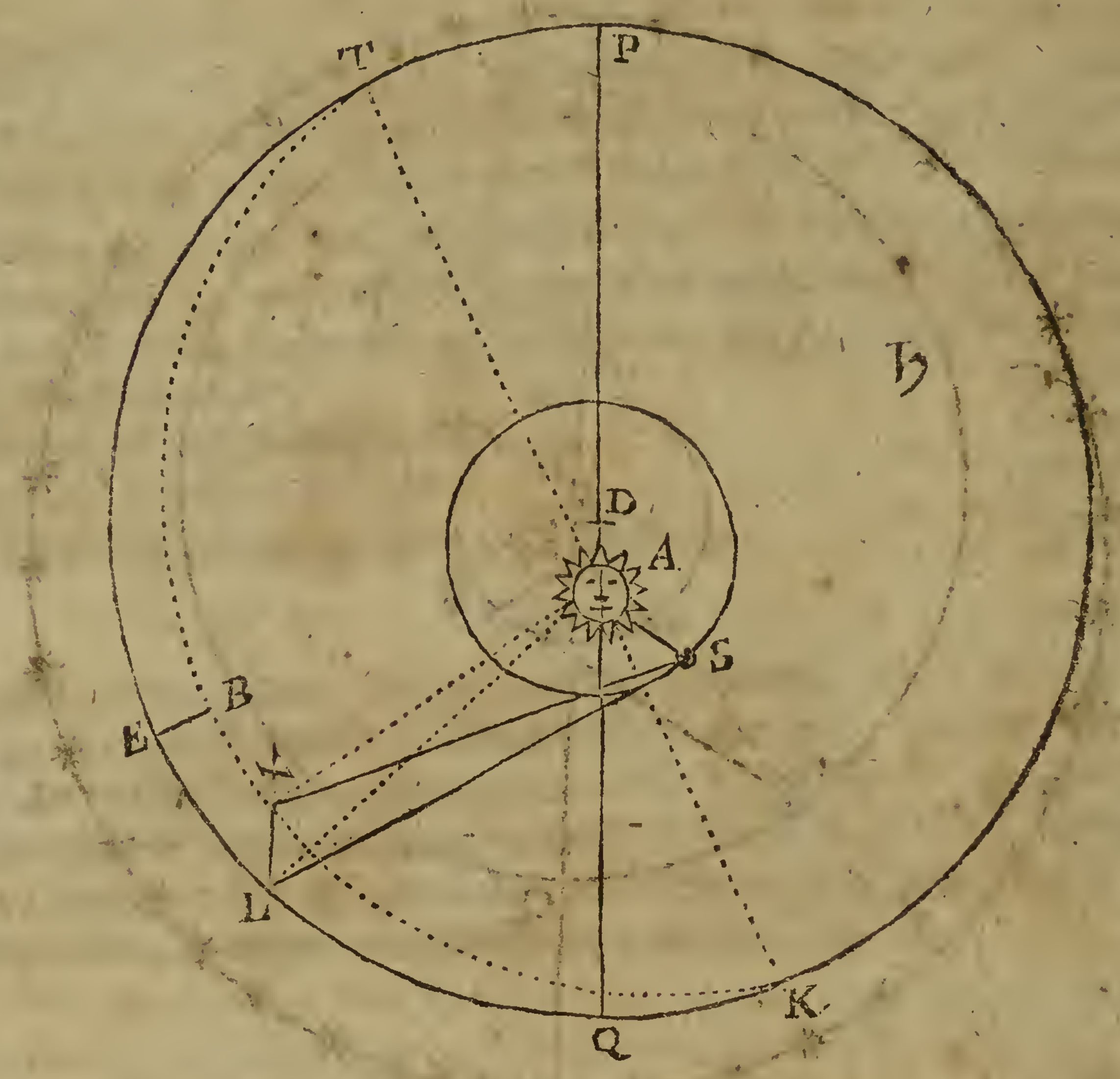
Sum of A N, and A S 1016040, 6,006911
Difference 819130; 5,913353
Tangent of 43ᵈ 34′ 20″, 9,978346
Tangent of 37 29 16: 9,884788
Dif. 6 5 4 *viz.* A N S, Which is

Angle A N S required.

the Parallax of the Earths Orbe, or the Difference, which is the Difference between the true place at A, and the apparent at S, the Earth being here at the time of his Obſervation to be ſubſtracted from the place ſeen from the Sun.

	D	′	″	
Place of ♄ from ☉ in the Ecliptique.	2	31	2	♉
Parallax of the Earths Orbe Subſtr.	6	5	4	
True place of ♄ from the Earth.	26	25	58	♈.

Third Figure of the Saturn.



To finde the Diſtance of Saturn from the Earth.

Analogie.	Sine of the angle A X S $6^{d}\ 5'\ 4''$,	9,025281
	Side A S 98455;	4,993238
	Sine of the angle X A S $92^{d}\ 51'\ 19''$,	9,999460
	Side S X 927721:	5,967417

To finde the apparent Latitude of Saturn from the Earth.

In the Triangle of the former Diagram X L S, the ſides are given, *viz.* S X 927721 X L 39296, and the angle L S X is ſought, therefore the Analogie is.

As the Side X S 927721,	5,967417
To the Side X L 39296;	4,594344
So the Radius 90^{d},	10,000000
To the Tangent of the angle X S L $2^{d}\ 25'\ 32''$;	8,626927

And becauſe ♄ is going from his Node Deſcending T, and is paſt the Limit of his greateſt Latitude, and approacheth towards his Node Aſcending, therefore his Latitude is $2^{d}\ 25'\ 32''$, South Deſcending.

To finde the apparent Latitude of Saturn otherwiſe.

In the preceding Diagram, the greateſt Inclination of the Orbite of ♄ B E is $2^{d}\ 30'\ 30''$ (which in our Dimenſions anſwers 41680 parts) which known, the Inclination of the intermediate parts of his Orbite may be gotten, and conſequently his Latitude.

Radius K E 90^{d},	10,000000
Sine of the angle X K L $2^{d}\ 30'\ 30''$;	8,641124
Sine of K L $77^{d}\ 53'\ 45''$,	9,990236
Sine of X L $2^{d}\ 27'\ 9''$:	8,631360

Which is the Inclination.

Sine

Sine of Elong. ♄ from ☉ $81^{d}.\ 3'\ 37''$,	9,994692
Sine of the Anom. of Commutation $92^{d}\ 51'\ 19''$;	9,999461
Co-tangent of Inclination $2^{d}\ 27'\ 9''$,	11,368223
Co-tangent of Latitude ,$2^{d}\ 25'\ 33''$:	11,372992

Which is the ſame, As before.

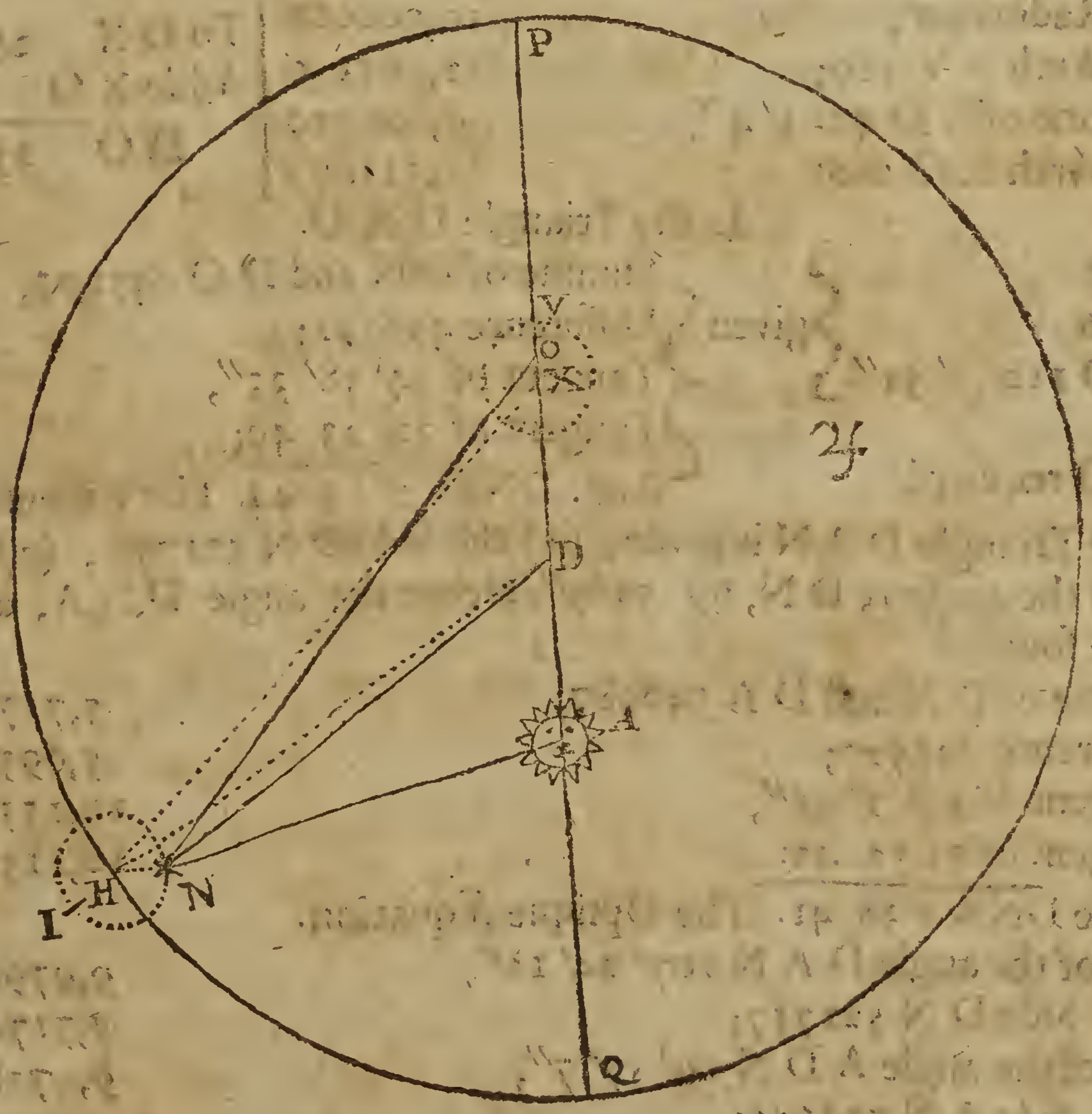
CHAP. XVI.

Of the Motion of the Star of Jupiter.

ANno 1593, September 28 at 8^{ho}: p.m. in the Merid. of *Uramburge*, (but in the Meridian of *London* at $7^{h}.\ 10'$) *Tycho* obſerved ♃ in the $13^{d}\ 56'$ of ♑, with $29'$ South Latitude, at which time the place of the Sun from the Earth is $15^{d}\ 18'\ 23''$ ♎, and his Diſtance from the Earth *99669*. The middle motions of ♃ being then as followeth.

	S	D	′	″
Middle Motion of ♃.	10	0	22	5
Aphelion of ♃.	6	7	47	5
Node Aſcend. ♃.	3	5	24	26
Anomalie of ♃.	3	22	35	0

Firſt Figure of Jupiter.



A Synopſis of the Calculation.

In the premiſed Diagram (fitted to the middle motions given) the Anomalie of ♃ $3^{s}\ 22^{d}\ 35'\ 0''$, is numbred from P to H, namely underſtood by the angle P X H, which known, we have in the Triangle X D H, three parts given, (1) the Side D H 522000, (2) the ſide D X 25230, (3) the angle D X H $67^{d}\ 25'\ 0''$. The angle DHX being required.

Side D H 522000,	5,717670
Sine of the angle D X H $67^{d}\ 25'\ 0''$;	9,965353
Side D X 25230,	4,401917
Sine of the angle D H X $2^{d}\ 33'\ 28''$:	8,649600

Simple

	D	′	″
Simple Anomalie P X H.	112	35	0
Angle D H X Subſtr.	2	33	28
Anomalie Equated P D H.	110	1	32
Motion of the Epicycle I S N	220	3	4.

In the Triangle D H N.

Summe of D H, and H N 522320,	5,717937
Difference 521680;	5,717404
Tangent of 69^{d} 58′ 28″,	10,438332
Tangent of 69 57 7:	10,437799
Ergò, Angle H N D	139^{d} 55′ 35″.
Ergò, Angle H D N	0 1 22.
Sine of the angle H N D 139^{d} 55′ 35″,	9,808731
Side D H 522000;	5,717670
Sine of the angle N H D 40^{d} 3′ 4″,	9,808529
Side D N 521757:	5,717468

	D	′	″
Anomalie equated P D H.	110	1	32
Angle H D N Adde.		1	21
Anomalie Co-æquated P D N	110	2	53.

♃ being found in the Diagram to be Infra-Diacentron, I therefore account the Exceſſe of the motion of the Epicycle above 180^{d}, *viz.* 40^{d} 3′ 4″, in the higher Semicircle of the Equant from X to O, then I ſay,

As the Radius 90^{d},	10,000000	To D X	25230.
To the Arch X V 320;	2,505150	Adde X O	206
So the Sine of X O 40^{d} 3′ 4″,	9,808529	D O	25436
To the Arch X O 206:	2,313679		

In the Triangle D N O.

D N 521757	given	Summe of D N and D O 547193,	5,738139
D O 25436		Difference 496321;	5,695762
Angle N D O 110^{d} 2′ 51″		Tangent of 34^{d} 58′ 33″,	9,844836
		Tangent of 32 23 49;	9,802459
Angle D N O required.		Ang. DNO 2 34 44. The Excentrique Æquat.	

Alſo in the Triangle D A N is given, (1) the Side D N 521757, (2) the Side D A 25230, (3) the angle A D N, 69^{d} 57′ 7″. Hence the angle D N A, and the Side A N are to be ſought.

Summe of D N and D A 546987,	5,737982
Difference 496527;	5,695947
Tangent of 55^{d} 1′ 26″,	10,155159
Tangent of 52 12 45:	10,113124
Angle DNA 2 38 41. The Optique Æquation.	
Sine of the angle D A N 107^{d} 24′ 12″,	9,979649
Side D N 521757;	5,717468
Sine of the angle A D N 69^{d} 57′ 7″,	9,972853
Side A N 513656:	5,710672

	D	′	″
Excentrique Æquation.	2	34	44
Optique Æquation.	2	38	41
Abſolute Æquation.	5	13	25

	S	D	′	″
Middle motion of ♃.	10	0	22	5
Æquation Subſtract.		5	13	25
Motion of ♃ from ☉ in his Orbite.	9	25	8	40
Node Aſcend. ♃ Subſtr.	3	5	24	26
Argument of Inclination.	6	19	44	14

In

To finde the Reduction, I ſay,

As the Radius 90ᵈ,	10,000000
To the Sine of the greateſt Reduction of ♃ 30″;	6,162696
So the double of the Argument of Inclinat. 39ᵈ 28′ 28″,	9,803275
To the Reduction of ♃ required 19″:	5,965971

And becauſe ♃ is departing from his South Node, and approaching towards the Limits of his greateſt Latitude, therefore (according to the former Rule) the Reduction is to be ſubſtracted from his place found in the Orbite.

	S	D	′	″
True motion of ♃ from ☉ in his Orbite.	9	25	8	40
Reduction Subſtract.				19
True motion of ♃ from ☉ in the Ecliptique.	9	25	8	21
True motion of ☉ from the Earth.	6	15	18	23
Anomalie of Commutation.	8	20	10	2

To finde the Inclination of ♃.

In the Rectangle Sphæricall Triangle X K L (*viz.* of the ſecond Figure of ♃) is given, (1) the Hypothenuſe K L 19ᵈ 44′ 14″ (2) the Side E B 12424 (*viz.* underſtood by the angle L K X.) Therefore I ſay,

As the Radius K E 90ᵈ,	10,000000
To the greateſt Inclination E B 12424;	4,094261
So the Sine of K L 19ᵈ 44′ 14″,	9,528540
To the Inclination of X L 4196:	3,622801

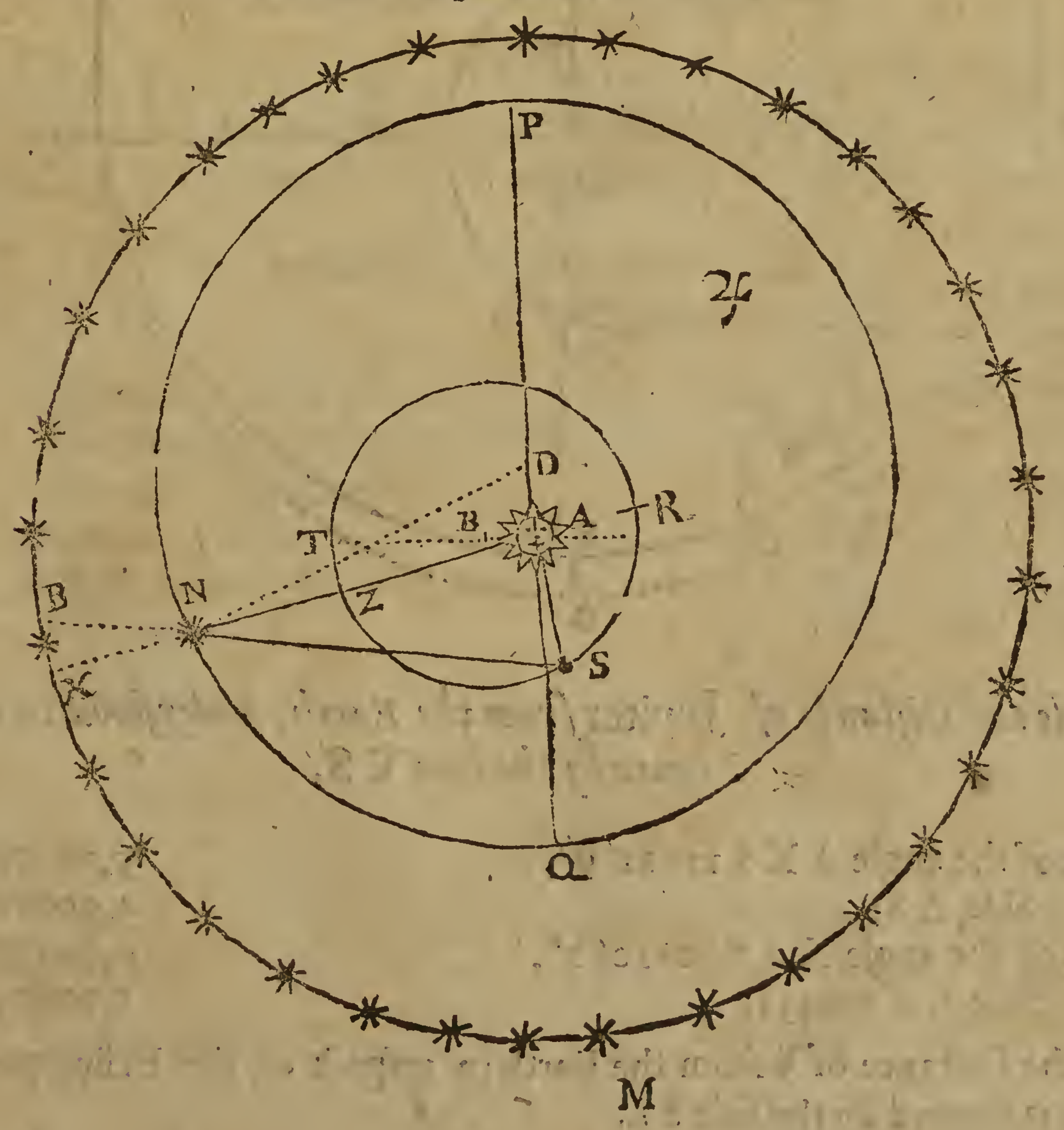
But whereas A X is to be put for the Radius, the Inclination X L will be but 4129, for as the common Radius of ♃ Orbite 522000, is to the Radius A L 513656, ſo is the Inclination 4196, to the Inclination required X L 4129.

Now having found his Inclination, and his diſtance from the ☉ in his Orbite, the ſaid Diſtance is to be corrected by Curtation.

In the third Figure following.

Hypothenuſe A L	513656	Summe	517785	5,714149.
Inclination L X.	4129	Difference	509527	5,707167.
		Aggregate		11,421316.
Diſtance of ♃ curtated	513639	Semiag.		5,710658.

Second Figure of Jupiter.



Of the ſecond Inæquality of Jupiter, *which depends upon the Annuall motion of the Earth.*

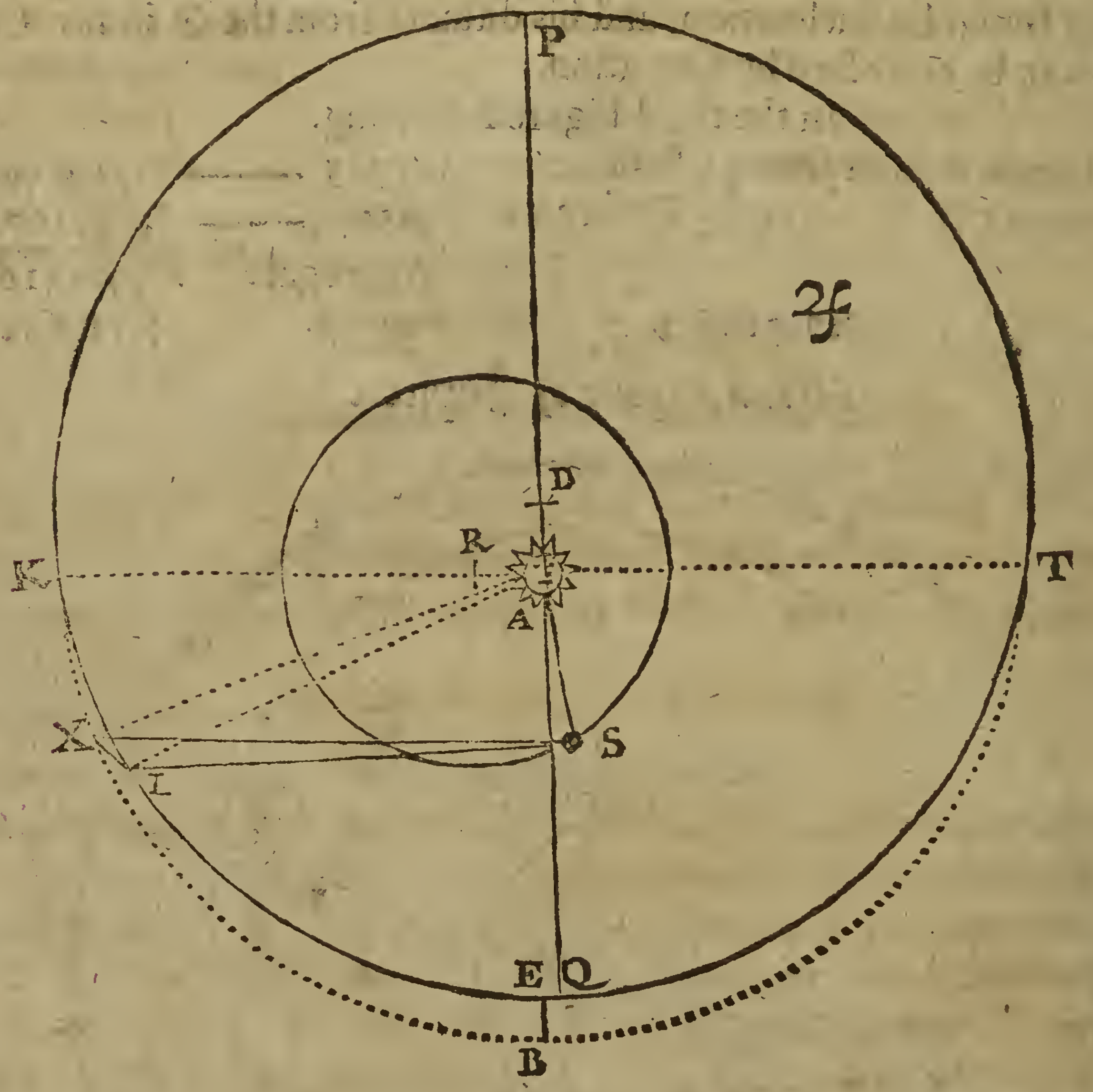
In this ſecond Theorie of ♃, the outermoſt great Circle repreſents the great Orbe of the fixed Stars, the next greater Circle having the letters P N Q P affixed, is the Orbite of ♃, and the third and leſſer Circle S R T S denotes the Orbite of the Earth, wherein from R (by Z) to S, I compute the Anomalie of Commutation 260ᵈ 10′ 2″, from which taking the Semicircle RZ 180ᵈ. there remains the Angle S A N 80ᵈ. 10′. 2″. which being known, with the two ſides conterminate, *viz.* A N 513639, and A S, 99669, the Angle A N S (which is the Parallax of the Earths Orbe) will thence be found to be 11ᵈ 11′ 9″: for Analogically I ſay,

As the Summe of the ſides A N and A S 613308,	5,787680
To their Difference 413970;	5,616969
So the Tangent of 49ᵈ 54′ 59″,	10,074900
To the Tangent of 38 . 43 50:	9,904189

Summe 88ᵈ 38 49. *viz,* angle A S N: the angle of Elongation.
Difference 11 11 9. *viz.* angle A N S: the Parallax of the Earths Orbe.

	S	D	′	″
Place of ♃ from ☉ in the Ecliptique, repreſented by the line.	9	25	8	21
Parallax of the EarthsOrb ANS (equal to the angle BNX) Subſtr.		11	11	9
Place of ♃ from the Earth ſhewed by the line S N B.	9	13	57	12

Third Figure of Jupiter.



To finde the Diſtance of Jupiter *from the Earth, underſtood in this Figure by the line* X S.

Sine of the angle A X S 11ᵈ 11′ 9″,	9,287784
Side A S;	4,998560
Sine of the angle X A S 80ᵈ 10′ 2″,	9,993573
Side X S 506231:	5,704349

Which is the Diſtance of ♃ from the Earth in reſpect of the Ecliptique, but the true Diſtance is ſhewed by the ſide S L.

To finde the Latitude of Jupiter, *ſeen from the Earth, repreſented by the angle* X S L.

In the Triangle S L X is given, (1) S X 506231, (2) X L 4130. Hence the angle L S X is demanded.

As X S 506231,	5,704340
To X L 4129;	3,615803
So the Radius 90^d,	10,000000
To the Tangent of the angle L S X 28′ 3″:	7,911454

Therefore the Latitude of ♃ is 28′ 3″ South.

Otherwiſe,

In the Diagram prefixed, the greateſt Inclination of the Orbite of ♃ B E is 1^d 21′ 50″, and the Argument of Inclination K L 19^d 44′ 14″, which known, the Inclination of his Orbite X L, and conſequently the angle of Latitude X S L, may ſpeedily be obteined.

I

Radius 90^d,	10,000000
Sine of the angle X K L 1^d 21′ 50″;	8,376615
Sine of K L 19^d 44′ 14″,	9,528540
Sine of X L 27′ 38″:	7,905155
Which is the Inclination of ♃.	

II

Sine of the angle of Elongation 88^d 38′ 49″,	9,999879
Sine of the angle of Commutation 80^d 10′ 2″,	9,993573
Co-tangent of Inclination 27′ 38″,	12,094832
Co-tangent of Latitude 28′ 3″:	12,088526
The ſame as before.	

CHAP. XVII.

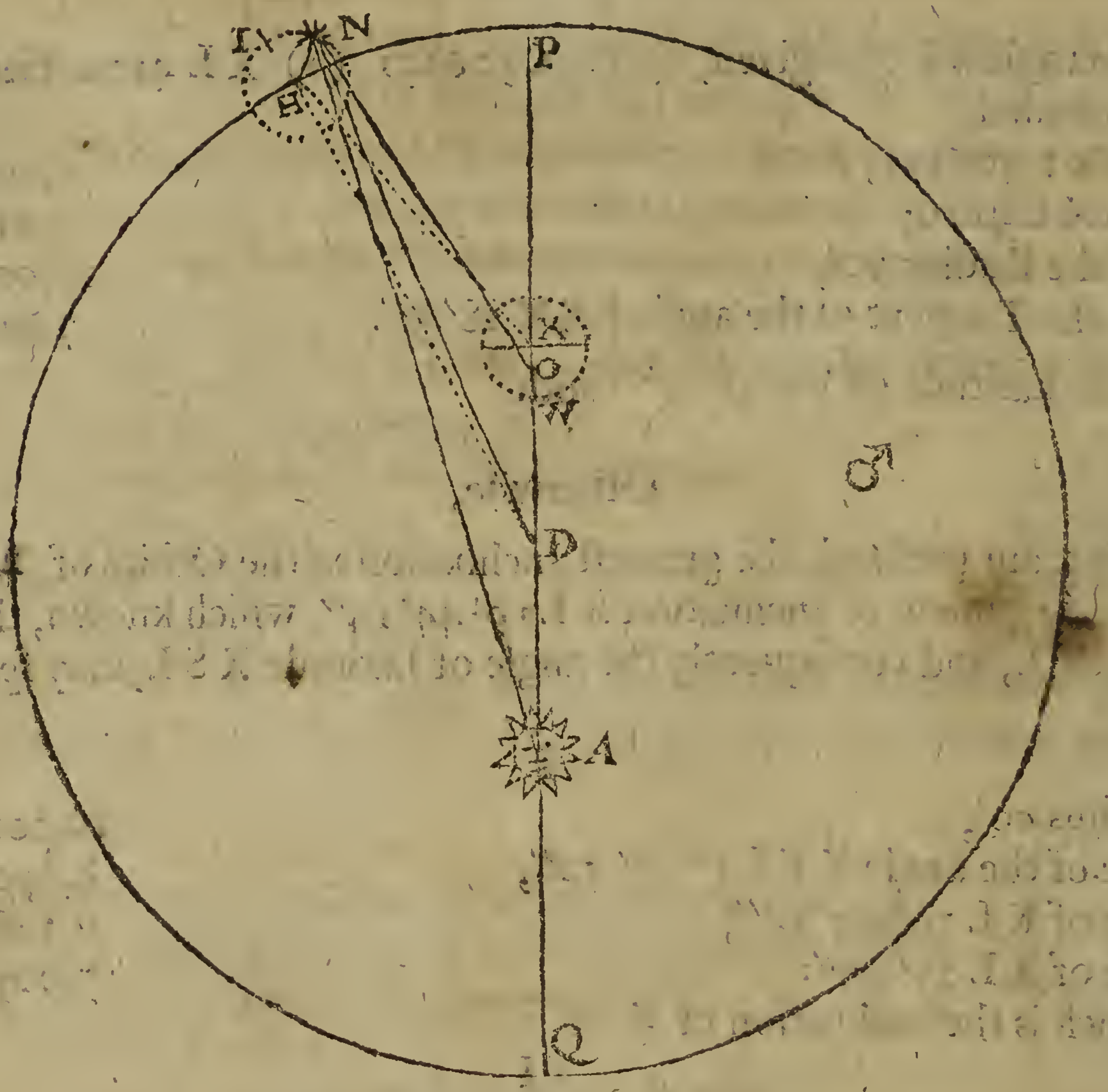
Of the motion of the Planet Mars.

ANno 1587, January 15^d 15^h 0′ (being reduced to the Meridian of *London*) that noble Lord of *Knudſtrop, Tycho Brahe* obſerved ♂ in 4^d 2′ ♎, with North Latitude 3^d 13′, *Tycho in Epiſtolis ad Landgravium Haſſiæ.*

At the time of this Obſervation.

	S	D	′	″
The true motion of the ☉ is	10	5	48	0
The Diſtance of ☉ from the Earth.	98461			
The middle motion of ♂.	5	4	50	42
Aphelion of ♂.	4	28	43	2
Node Aſcend. ♂.	1	16	33	20
Anomalie of ♂.	0	6	7	40

Firſt Figure of Mars.



In this Diagram I number the Anomalie of ♂ from P to H 6^{d} 7′ 40″, whoſe Complement 173^{d} 52′ 20″, is the angle D X H, which given with the Side D H 152040, and the Side D X 14105, the angle D H X will be 34′ 3″.

Side D H 152040,	5,181958
Sine of the angle D X H 173^{d} 52′ 20″;	9,028352
Side D X 14105,	4,149373
Sine of the angle D H X 34′ 3″:	7,995767

Simple Anomalie P X H,	6^{d}	7′	40″
Angle D H X Subſtr.		34	3
Anomalie æquated P D H.	5	33	37
Motion of the Epicycle I H N.	11	7	14

In the Triangle D H N.

Summe of D H and D N 152500,	5,183270
Difference 151580;	5,180642
Tangent of 5^{d} 33′ 37″,	8,988343
Tangent of 5 31 37:	8,985715

Aggregate 11 5 14. *viz.* Angle H N D.
Difference 2 0 *viz.* Angle H D N.

Sine of the angle H N D 11^{d} 5′ 14″,	9,283985
Side D H 152040;	5,181958
Sine of the angle D H N 168^{d} 52′ 46″,	9,285274
Side D N 152492:	5,183247

	D	′	″
Anomalie æquated P D H.	5	33	37
Angle H D N Subſtr.		2	0
Anomalie Co-æquated P D N.	5	31	37.

In the former Diagram ♂ is Supra-Diacentron, therefore I number the motion of the Epicycle 11^{d} 7′ 14″ in the nether part of the Equant from X to O, then I ſay,

As the Radius 90^{d},	10,000000
To the Arch X W 460;	2,662758
So the Sine X O 11^{d} 7′ 14″,	9,285274
To the Arch X O 89:	1,948032

From D X	14105
Subſtr. X O	89
Reſts D O	14016

In the Triangle D N O.

D N 152492
D O 14016
Angle D N O 5 31 37
given

Summe of D N and D O 166508,	5,221435
Difference 138476;	5,141374
Tangent of 87^{d} 14′ 11″ ½,	11,316330
Tangent of 86 40 42:	11,236269

Angle D N O required. Angle DNO 0 33 29 ½ The Excentrique Æquat.

Again in the Triangle D N A, we have known, (1) the ſide D N 152492, (2) the ſide D A 14105, (3) the angle included 174^{d} 28′ 23″. Hence the angle D N A, and the ſide A N are required.

Summe of D N and D A 166597,	5,221666
Difference 138387;	5,141094
Tangent of 2^{d} 45′ 48″ ½,	8,683670
Tangent of 2 17 46:	8,603099

Ang. DAN 5 3 34 ½.
Ang. DNA 0 28 2 ½. *Viz.* the Optique Æquation.

Sine of the angle D A N 5^{d} 3′ 34″,	8,945428
Side D N 152492;	5,183247
Sine of the angle A D N 5^{d} 31′ 37″,	8,983689
Side A N 166536:	5,221508

	D	′	″
Excentrique Æquation.	0	33	29 ½
Optique Æquation.	0	28	2 ½
Abſolute Æquation.	1	1	32

	S	D	′	″
Middle motion of ♂	5	4	50	42
Æquation Subſtract.		1	1	32
Motion of ♂ from ☉ in his Orbite.	5	3	49	10
Node Aſcend. ♂ Subſtract.	1	16	33	20
Argument of Inclination.	3	17	15	50

To finde the Reduction, and to obtein his true place in the Ecliptique.

As the Radius 90^{d},	10,000000
To the Sine of the greateſt Reduction of ♂ 53″;	6,408299
So the Sine of the double of the Argument of Inclination, 34^{d} 31′ 40″,	9,753434
To the Sine of the Reduction required 30″:	6,161733

Which Reduction is to be added to the Place in the Orbite, becauſe he is departing from his Limit, and is going towards the South Node.

	S	D	′	″
True motion of ♂ from ☉ in his Orbite.	5	3	49	10
Reduction Adde.				30
True motion of ♂ from ☉ in the Ecliptique.	5	3	49	40
True place of the ☉ from the Earth.	10	5	48	0
Anomalie of Commutation.	5	1	58	20

To compute the Inclination of the Planets.

In the Sphæricall Triangle X K L, of the third Diagram of ♂, is given, (1) the Hypothenuſe L K 72^{d} 44′ 10″, (2) the angle E K B, namely underſtood by the ſide E B 4916. Hence, to finde X L, the Analogie is,

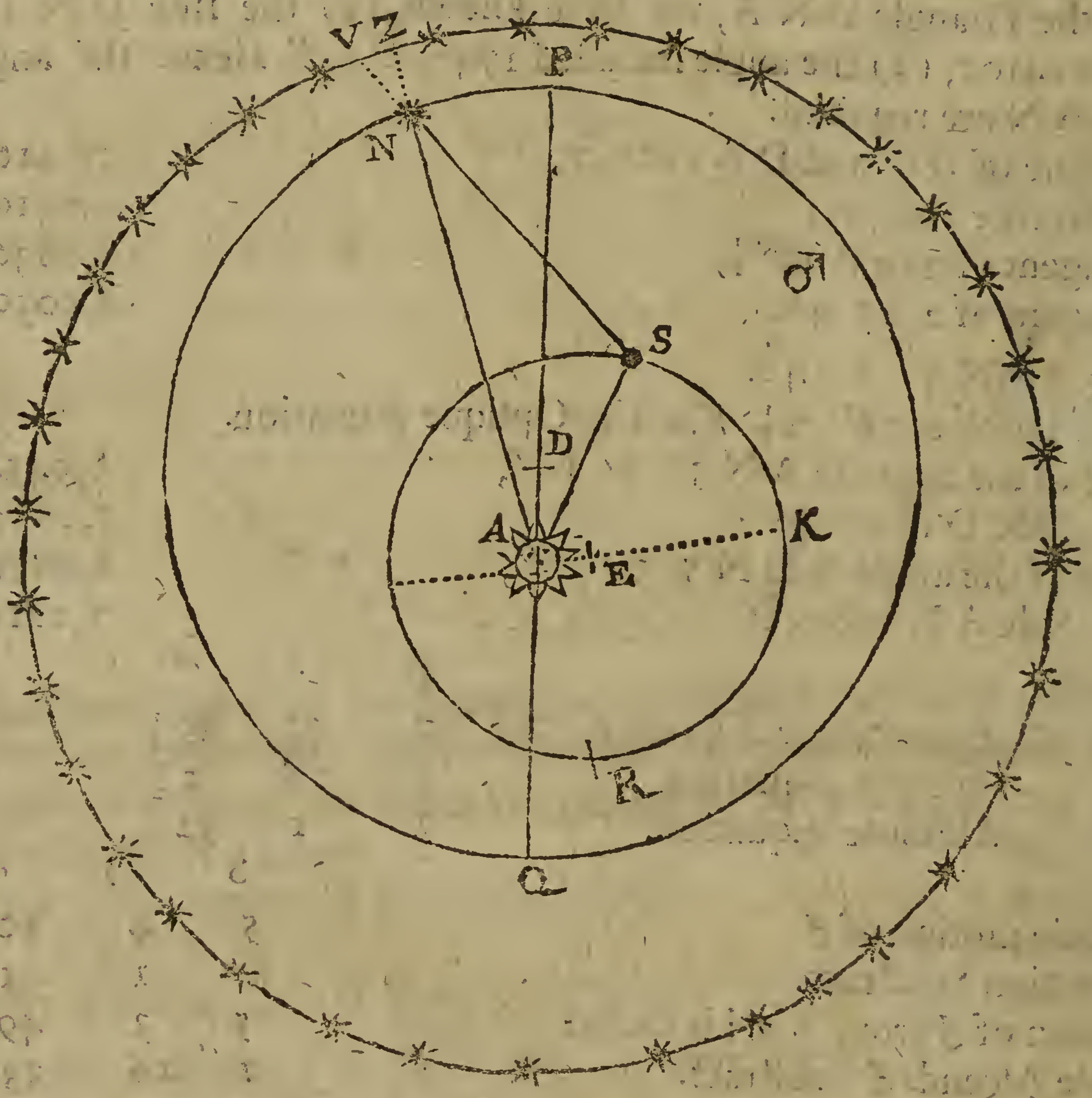
As the Radius K E 90^{d},	10,000000
To the greateſt Inclination E B 4916;	3,691612
So the Sine of K L 72^{d} 44′ 10″,	9,979989
To the Sine of X L 4695:	3,671592

Which is the Inclination agreeing to the Common Radius 152040, but becauſe his diſtance from the ☉ 166536, is to be put for the Radius, the Inclination is but 5142. Having then found his Inclination, and his diſtance from the ☉ in his Orbite, we are thereby to finde his diſtance Curtated.

In the third Figure of ♂.

Hypothenuſe A L	166536	Summe	171678	5,234714.
Inclination X L	5142	Difference	161394	5,207887
		Aggregate		10,442601
Diſtance Curtated A X	166456.	Semiaggreg.		5,221300

Second Figure of Mars.



Of the ſecond Inæquality, call'd the Parallax of the Earths Orbite.

By the former Praxis, the diſtance of ♂ from ☉ (repreſented in this Diagram by the ſide A N) is 166456, and the diſtance of the Earth from the ☉, underſtood by the ſide A S, is 98461, which known, I number the Anomalie of Commutation from R (by K) to S 151^d 58′ 20″, whoſe Complement 28^d 1′ 40″ is the angle S A N, then having theſe three parts given, we may (by the ſolution of the ſaid Triangle) finde the other three parts, namely, (1) the Parallax of the Earths Orbe A N S (being equall to V N Z) (2) the angle of Elongation A S N, (3) the ſide S N, which is the diſtance of ♂ om the Earth.

Summe of A N and A S 264917,	5,423109
Difference 67995;	4,832477
Tangent of 75^d 59′ 10′,	10,602781
Tangent of 45 48 5:	10,012149

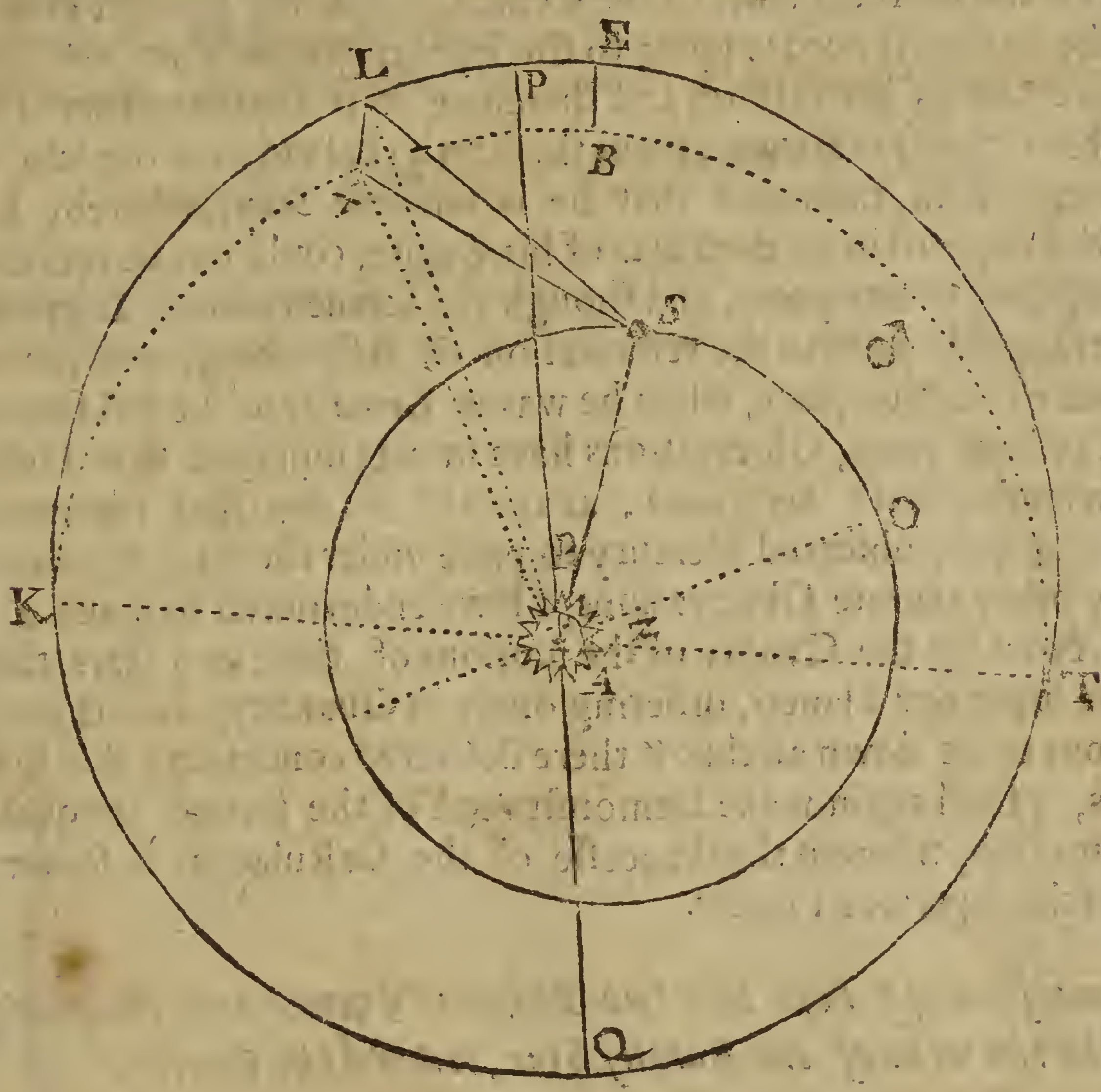
Angle { A S N 121 47 15. Angle of Elongation.
Angle { A N S 30 11 5. Parallax of the Earths Orbe.

Sine of the angle A N S 30^d 11′ 5″,	9,701386
Side A S 98461;	4,993264
Sine of the angle N A S 28^d 1′ 40″,	9,672005
Side N S 92020:	4,963023

Place

	S	D	′	″
Place of ♂ from ⊙ repreſented in the former Figure by the line A N S.	5	3	49	40
Parallax of the Earths Orbe A N S or Z N V, Adde.	1	0	11	5
True place of ♂ from the Earth, ſhewed by the line S N V.	6	4	0	45

Third Figure of Mars.



To finde the angle of the apparent Latitude of Mars, *repreſented in this Figure by the angle* L S X.

Radius K E 90^{d},	10,000000
Sine of the angle L K X 1^{d} 51′ 4″;	8,509234
Sine of K L 72^{d} 44′ 10″,	9,979980
Sine of L X 1^{d} 46′ 4″:	8,489214
Sine of the angle A S X 121^{d} 47′ 15″,	9,929423
Sine of the angle S A X 28^{d} 1′ 40″;	9,672005
Co-tangent of Inclination X L 1^{d} 46′ 4″,	11,510558
Co-tangent of the angle of Latitude L S X 3^{d} 11′ 45″:	11,253140

Or in the Triangle L X S, the Analogie may be thus.

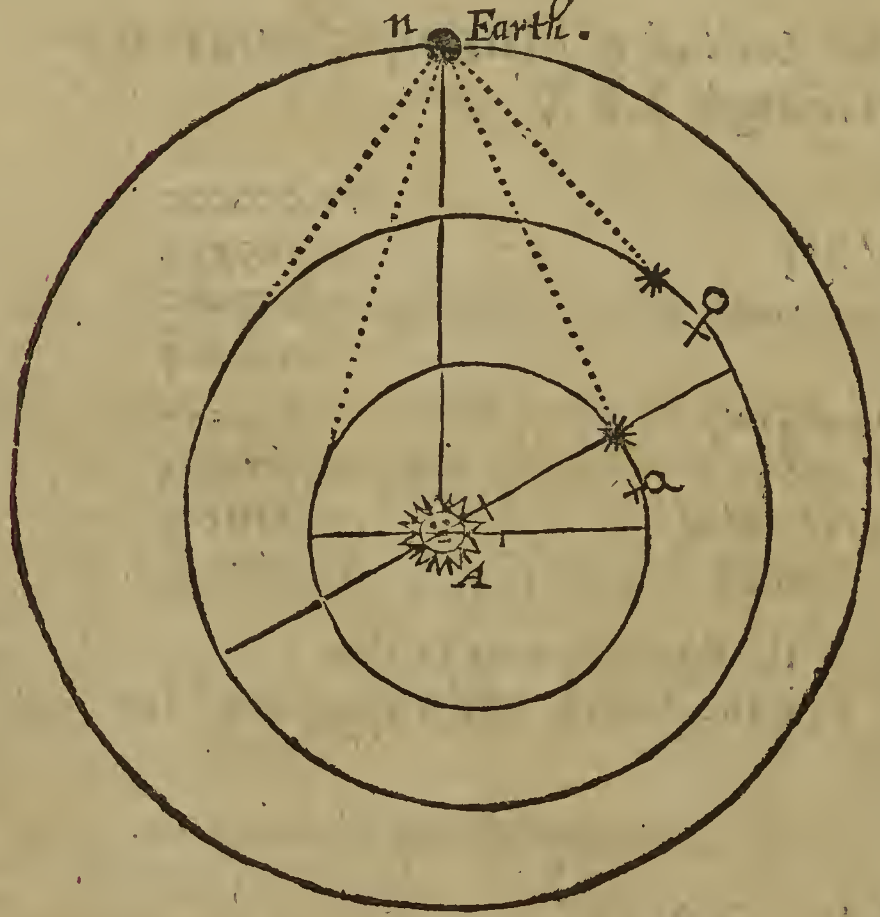
As the ſide X S, is to the ſide X L: ſo is the Radius, to the Tangent of the angle L S X.

CHAP. XVIII.

Of the motion of the two inferiour Planets, Venus *and* Mercury.

THe two Planets Venus and Mercury we call Inferiours, not that they are inferiour in Luſtre or Beauty to the Superiours, but becauſe they are placed next the Center, and keep their perpetuall gyre, and motions within the Orb of the Earth, as the other three do without, and above the Orbe of the Earth: Hence it is that theſe two Planets (contrary to the ſuperiour Ones) are not viſible to us, when they are conjoyn'd in one and the ſame line, which paſſeth through the Center of the Sun to the Earth, whereby the acceleration and retardation of their motions, which in their Revolutions they are ſubject to, are not ſo perceptable and eaſie to be found out, as in the ſuperiour Planets, yet neverthelеſſe theſe (like to the other Primarie Planets) move about the Sun with Excentrique motions from him, and are ſwift in motion when they are neer the Sun, and ſlow when they are remote from him, according to their Poſition in reſpect of the Earth. The brighteſt of theſe is Venus, who is placed next within the Earths Orbite, and above the Orbite of Mercury, (who is the neereſt Planet to the Center, ſo that the greateſt Digreſſion of Venus from the Sun muſt needs appear to the Eye far greater then Mercurie, in reſpect of the large extent of her Orbite, and therefore it is that Mercury (becauſe of the parvity of his Orbite) is always (from the Earth) beheld neer the Sun, as the following Figure expreſſeth, inſomuch that he is ſeldome ſeen, whereby his motion for want of Obſervations in all the Parts of his Orbite, could not be rectified, nor found neer the truth, till of late years, and though the learned *Kepler* deſerves much praiſe for his indefatigable pains in the reſtauration of Aſtronomy, yet for want of ſome Obſervations of his true place, when he was *in Linea Solis*, he fell ſomewhat ſhort of truth; but of later years, Obſervations have in part ſupplyed that Defect, for upon the 7 of November 1631 *Stylo novo*, at $10^{h}\,28'$ *A. M.* that reverend French-man Monſieur *Gaſſende*, obſerved Mercury to paſſe under the Sun, by comparing which with ſundry other acurate Obſervations, I have endevoured to make a reſtitution of his motion. Now for the Quality of the motions of theſe two Stars, they are naturally like to the ſuperiour Planets, differing onely in Quantity, and therefore it would be ſuperfluous to ſet down all that I there delivered concerning the firſt Inæquality, neverthelеſs, I ſhall again make Demonſtration of the ſecond Inæquality cauſed by the Earths motion, wherein the Proceſſe of the Calculation is ſomewhat different from that of the ſuperiour Planets.

A Scheme ſhewing how the two Planets Venus *and* Mercury *are moved within the Orbe of our Earthy Star, toward the Center.*



By this Figure you may plainly ſee how theſe two Planets move within the great Orbe of the Earth towards the Center, and why the greateſt Digreſſion of ♀, from the ☉, cannot exceed 48^{d} nor Mercury 29^{d}, as the Angles A N ♀, and A N ☿, repreſent, whereby they cannot be obſerved from the Earth never to be in □ or ☍ of the ☉, in regard of the Earths ſcituation without there Orbites.

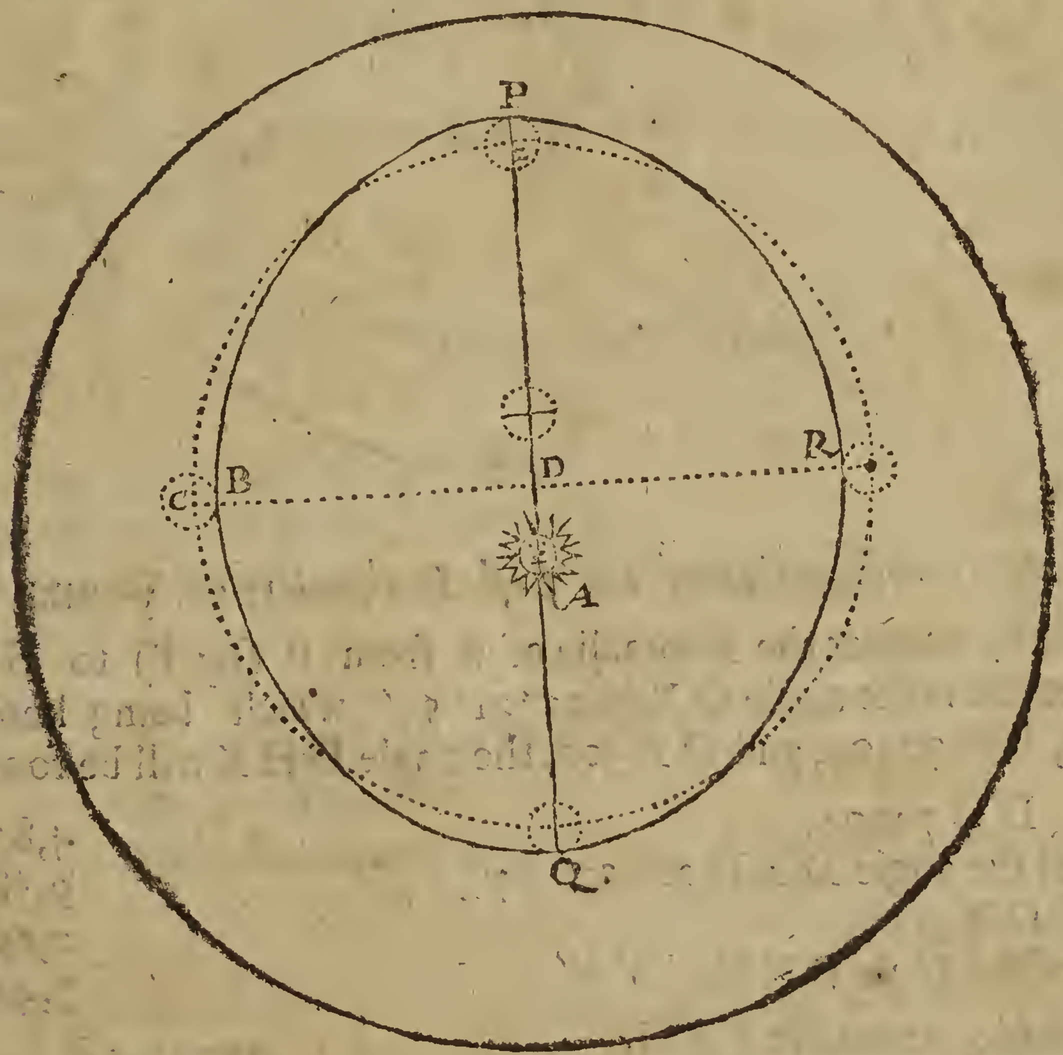
The Proſthaphæreſis, or Æquation of the Orbe of ♀ or ☿, (contrary to the ſuperiour Planets) is an angle at the Earth, comprehended between the line of the ☉, and the place of a Planet in his Orbe, underſtood in the former Figure by the angle A N ♀, or A N ☿, which is nothing elſe but their apparent Digreſſion from the line of the ☉, as the Planet is beheld from N, the place of the Earth.

But the Nodes of theſe Planets differ not in Quality of their motions from the ſuperiour Planets; and the Inclination of their Orbites and Latitudes from the Earth, be alſo much alike.

A

A Table ſhewing the particular Dimenſions of the Orbites of Venus *and* Mercury *in ſuch parts, whereof the Radius of the Earths Orbe is* 100000.

	♀	☿
Semidiameter of the Excentrique Circle D Z or D G	72304	38240
Semidiameter of the Epicycle B G or Z P.	3	400
Which in the Circle Equant æqualizeth X V.	3	400
Bi-ſected Excentricity D X or D A.	500	8130
In the Ellipſis.		
Aphelion Semidiametient D P equall to D Q.	72307	38640
Diacentron Semidiametient D B, or D R.	72301	37840



In this Figure, the outermoſt Circle repreſents the great Orbe of the Earth, and the Ellipſis within the ſame, having the Letters P B Q R affixed, is the Orbite of ♀ or ☿, whoſe Dimenſions are notified above in the Table.

CHAP. XIX.

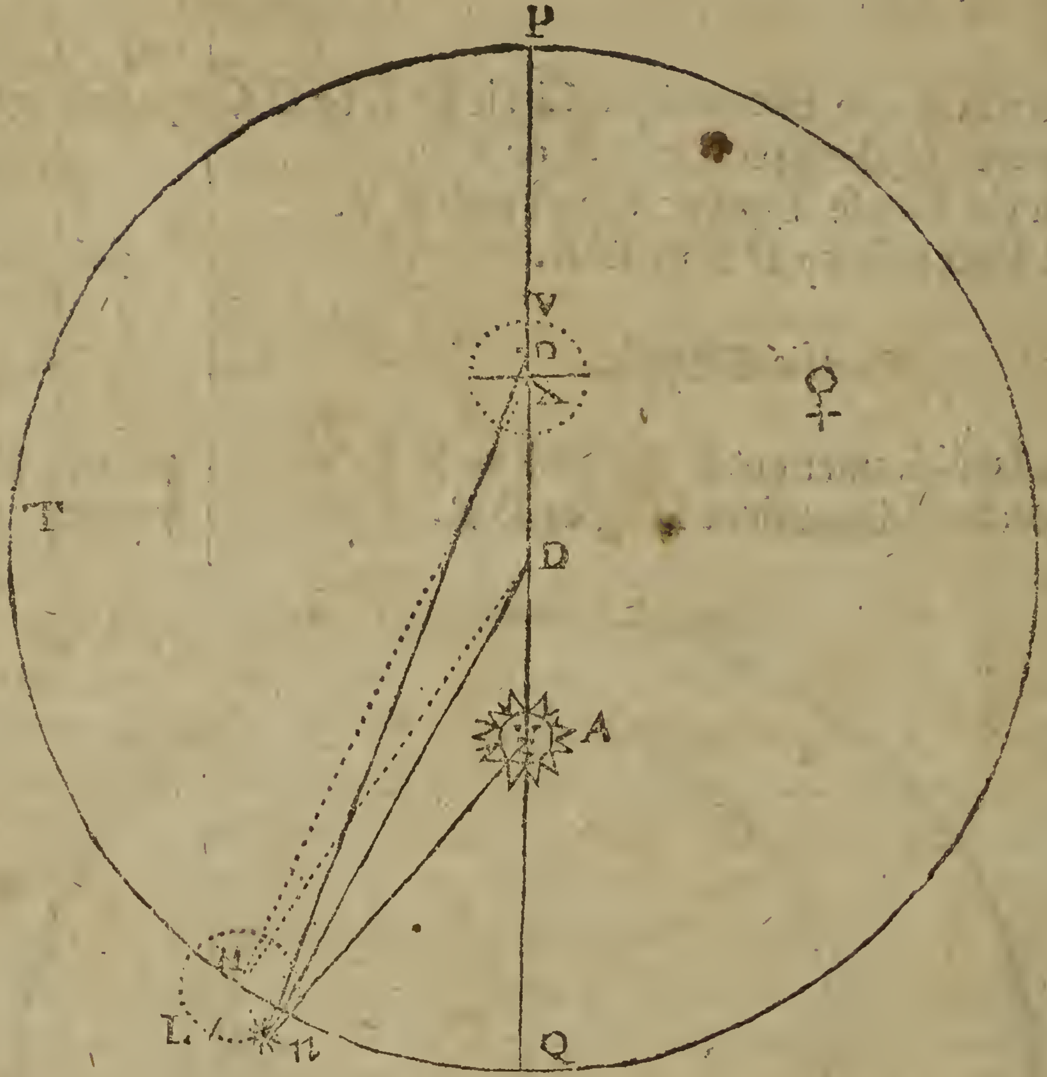
Of the Calculation of the true motion of the Star of Venus.

ANno 1587, January $15^d\ 4^h\ 40'$ P. M. noble *Tycho* obſerved ♀ in $16^d\ 55'$ ♓, with $2^d\ 39'$ North-Latitude. *Vide Pag. 56 Epiſtolarum.*

For the difference of Meridians between *London* and *Uraniburge* is to be ſubſtracted 50′, therefore the time in the Meridian of *London*, was Jan. $15^d\ 3^h\ 50'$, at which time,

	S	D	′	″
The true motion of the ☉ is	10	5	19	36
Diſtance of the ☉ from the Earth.	98454			
Middle motion of ♀.	3	11	38	42
Aphelion of ♀.	10	4	12	36
Node Aſcend. ♀.	2	12	51	1
Anomalie of ♀.	5	7	28	6

Firſt Figure of Venus.



An Inveſtigation of the firſt Inæquality of Venus.

In this Scheme I number the Anomalie of ♀ from P (by T) to H 157^d 28′ 6″, whoſe Complement is the angle Q X H 22^d 31′ 54″, which being known, with the including ſides, D H 72304, and D X 500, the angle D H X will be found 0^d 9′ 7″.

D H 72304,	4,859162
Sine of the angle D X H 22^d 31′ 54″;	9,583418
D X 500,	2,698970
Sine of the angle D X H 0^d 9′ 7″:	7,423226

Simple Anomalie P X H.	157^d	28′	6″
Angle D X H Subſtr.		9	7
Anomalie æquated P D H.	157	18	59
Motion of the Epicycle.	314	37	58.

In the Triangle D H N.

Summe of D H and H N 72307,	4,859180
Difference 72301;	4,859144
Tangent of 22^d 41′ 1″,	9,621148
Tangent of 22 40 51	9,621112

Ag. 45 21 56 } angle { H N D.
Dif. 0 0 6 } angle { H D N.

Sine of the angle H N D 45^d 21′ 56″,	9,852238
D H 72304;	4,859162
Sine of the angle D H N 134^d 37′ 58″,	9,852250
D N 72306:	4,859174

	D	′	″
Anomalie æquated P D H.	157	18	59
Angle H D N Adde,			6
Anomalie Co-æquated.	157	19	5;

In this Paradigme Venus is Infra-Diacentron, and therefore the motion of the Epicycle is to be accounted in the uppermoſt Semicircle of the Equant from X towards V, therefore I ſay,

As the Radius X V 90^{d},	10,000000	To D X	500
To the Arch X V 3 parts;	0,477121	Adde X O	2
So the Sine X O 45^{d} 22′ 2″,	9,852250	D O	502
To the Arch X O 2^{d}:	0,329371		

In the Triangle D N O.

D N 72306. D O 502. Angle O D N 157^{d} 19′ 5″. } given	Summe of D N and D O 72808,	4,862179
	Difference 71804;	4,856149
	Tangent of 11^{d} 20′ 27″,	9,302246
	Tangent of 11 11 18:	9,296216
Angle D N O required.	Angle D N O 0 9 9. The Excentrique Æquation.	

In the Triangle D N A.

I

Summe of D N and D A 72806,	4,862167
Difference 71806;	4,856161
Tangent of 78^{d} 39′ 32″,	10,697743
Tangent of 78 30 19:	10,691737
Angle D N A 0 9 13. The Optique Æquation.	

II

Sine of the angle D A N 157^{d} 9′ 52″,	9,588930
Sine of the angle A D N 157^{d} 19′ 5″;	9,586154
Side D N 72306,	4,859174
Side A N 71845:	4,856398

	D	′	″
Excentrique Æquation.	0	9	9
Optique Æquation.	0	9	13
Abſolute Æquation.	0	18	22.

	S	D	′	″
Middle motion of ♀.	3	11	38	42
Æquation Subſtract.			18	22
Motion of ♀ from ⊙ in her Orbite.	3	11	20	22
Node Aſcend. Subſtract.	3	12	51	1
Argument of Inclination.	0	28	29	21.

To finde the Reduction.

As the Radius 90^{d},	10,000000
To the Sine of the greateſt Reduction 3′0″;	6,940847
So the Sine of the Double of the Argument of Inclinat. 56^{d} 58′ 42″.	9,923484
To the Sine of the Reduction required 2′ 31″:	6,864331

Becauſe ♀ is departing from her North Node, the Reduction is to be ſubſtracted from her place in the Orbite.

	S	D	′	″
True motion of ♀ from ⊙ in her Orbite.	3	11	20	22
Reduction Subſtract.			2	31
True motion of ♀ from ⊙ in the Ecliptique.	3	11	17	51
True place of the ⊙ Subſtr.	10	5	19	36
Anomalie of Commutation.	5	5	58	15.

To finde the Inclination of the Planes.

In the third Figure of ♀ we have in the Rectangle Sphæricall Triangle X K L two parts given: (1) the Hypothenuſe K L 28^{d} 29′ 21″, (2) the Valor of the angle L K X (underſtood by the Side B E) 4264, the ſide X L being required.

As the Radius K E 90^{d},	10,000000
To the Sine of the greateſt Inclination E B 4264;	3,629817
So the Sine of K L 28^{d} 29′ 21″,	9,678912
To the Sine of X L 2034:	3,308329

But whereas the diſtance of ♀ from ☉ 71845, is to be put for the Radius, the Inclination X L will be but 2021. For,

As 72304, bears Proportion to 71845, the ſame Proportion bears 2034, to 2021.

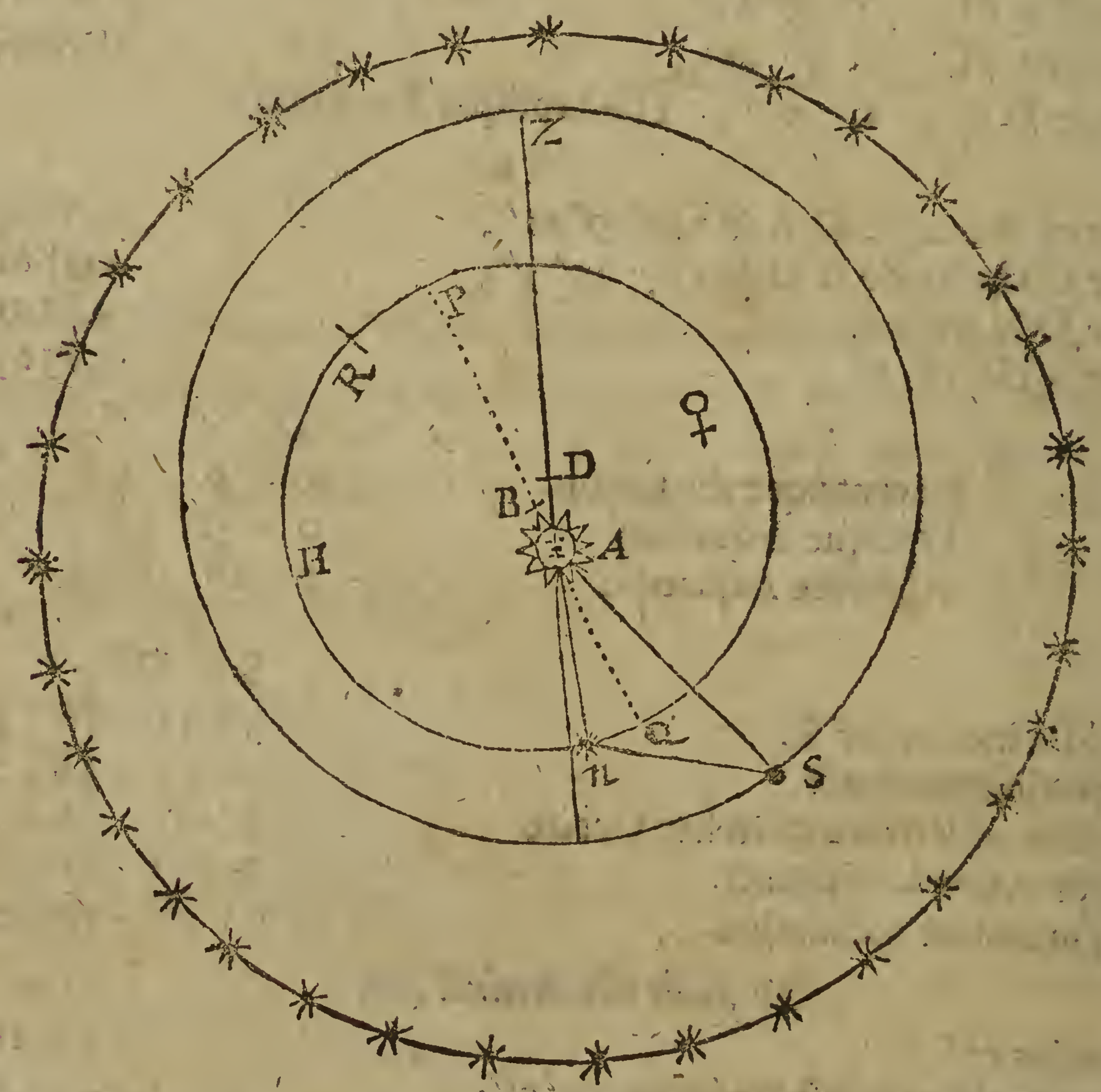
To finde the Diſtance Curtated, of Venus *from the Sun.*

The diſtance of ♀ from ☉ in her Orbite is above found to be 71845, and the Inclination of her Orbite 2021. Hence, her diſtance Curtated is thus found.

In the third Figure of ♀.

Hypothenuſe A L	71845	Summe	73866	4,868445
Inclination X L	2021	Difference	69824	4,844005
		Aggregate		9,712950
Diſtance of ♀ curtated A X	71817.	Semiaggreg.		4,856225

Second Figure of Venus.



Of the ſecond Inæqnality of Venus, *call'd the Proſthaphæreſis, or Parallax of her Orbe.*

In this Diagram I number the Anomalie of Commutation 155^{d} 58′ 15″, from R (by H, to N, the Complement whereof is the angle S A N 24^{d} 1′ 45″, which known, with the ſide A S (the diſtance of the Earth from the ☉) 98454, and the ſide A N (the Diſtance of the ♀ from ☉) 71817, the ſide S N (the Diſtance of ♀ from the Earth) and the angle A S N (the Parallax of the Orbe) may thereby be found according to the following work.

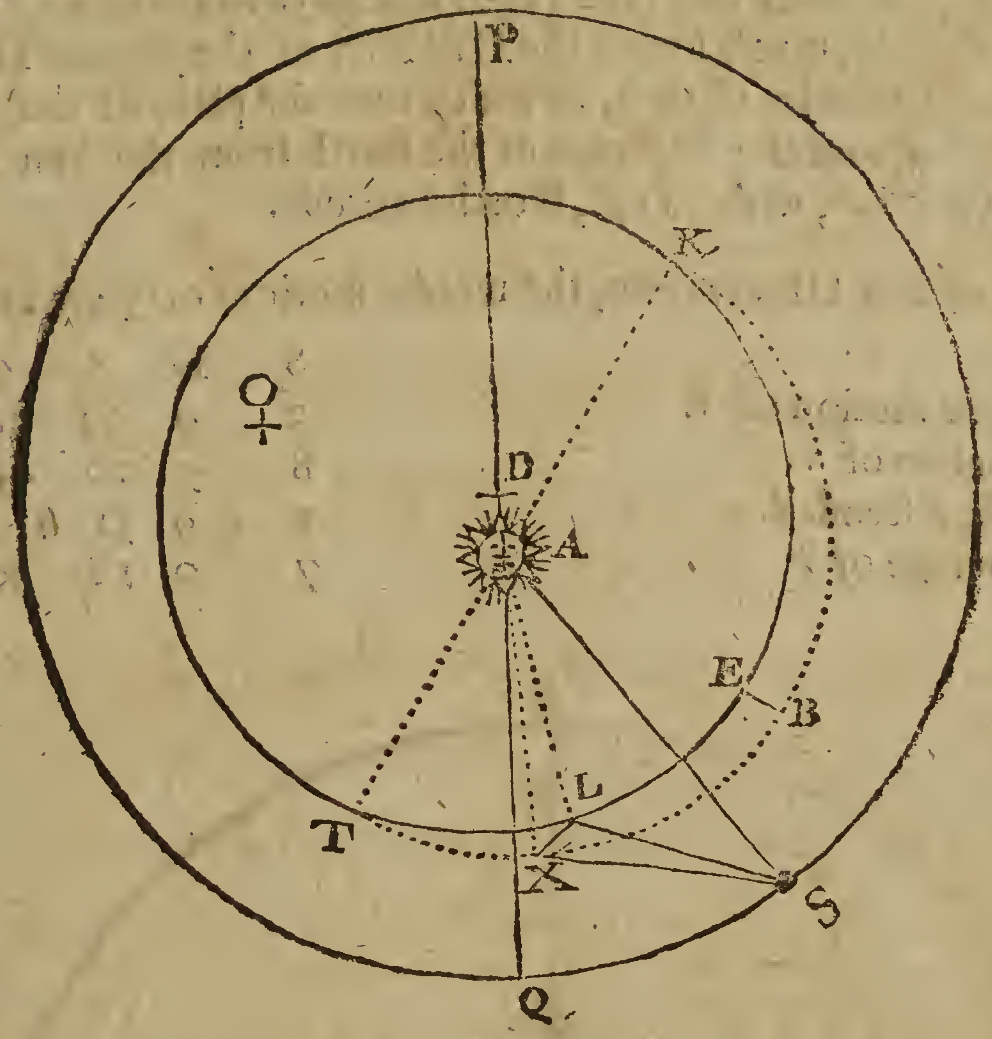
Sum of A S and A N 170271,	5,231140	Sine of the ang. ASN 41^{d} 40′ 2″,	9,822693
Difference 26637;	4,425485	Side A N;	4,856225
Tangent of 77^{d} 59′ 7″,	10,671974	Sine of the ang. SAN 24^{d} 1′ 45″,	9,609809
Tangent of 36 19 5:	9,866319	Side S N 43989:	4,643341

Angle ASN 41 40 2. which is the Parallax of the Orbite of ♀, in reſpect of the Earths extracentricall poſition at S.

Place

	S	D	′	″
Place of the ☉ from the Earth.	10	5	19	36
Parallax of the Orbe, Adde.	1	11	40	2
True motion of ♀ from the Earth.	11	16	59	38.

Third Figure of Venus.



To finde the true Latitude of Venus *from the Earth.*

In the Triangle S X L, we before found X S to be 43989, and X L, to be 2021, from whence the angle of Latitude X S L is required: therefore the Analogie is,

As X S 43989,	4,643341
To L X 2021;	3,305565
So the Radius 90^{d},	10,000000
To the Tangent of the angle 2d 37′ 50″:	8,662224

Which 2^{d} 37′ 50″ was the true Latitude of ♀ from the Ecliptique, in reſpect of the Earths ſcite at S. The ſaid angle may alſo be found by the Inclination, as is ſhew'd in the ſuperiour Planets, which way (becauſe I follow it in the Book) I ſhall here for variety ſake, inſert.

Radius T E 90^{d},	10,000000
Sine E B 3^{d} 22′ 50″;	8,770613
Sine T L 28^{d} 29′ 21″,	9,678512
Sine L X 1^{d} 36′ 42″:	8,449125
Sine of the angle of Elongation A S X 41^{d} 40′ 2″,	9,822693
Sine of the angle of Commutation S A X 24^{d} 1′ 45″;	9,609809
Co-tangent of the Inclination L A X 1^{d} 36′ 42″,	11,550732
Co-tangent of the Latitude L S X 2^{d} 37′ 50″:	11,337848

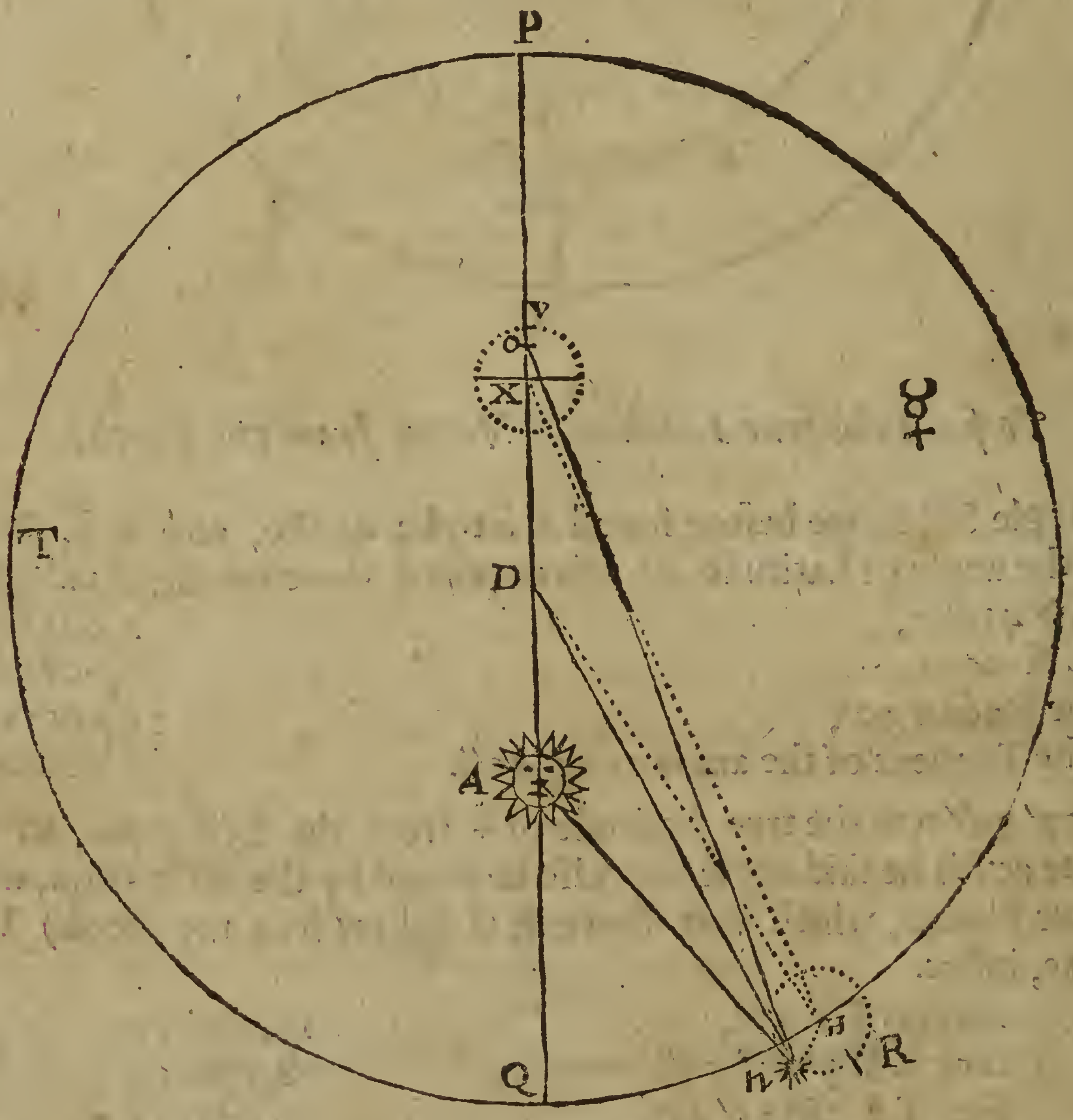
CHAP. XX.

A Demonſtration of the true motion of the Star of Mercury.

IN the year 1481, October 22^{d} 5^{ho} 25′ A. M. (being reduced to the Meridian of *London) Bernard Walther* obſerved (at *Normberge* in *Germanie)* that ☿ was more Eaſt then ♄, namely, much about the Quantity of the Moons Diameter, having about the ſame Latitude with ♄, at which time the place of the Sunne from the Earth is 7^{d} 53′ 29″ ♏, and the Diſtance of the Earth from the Sun 98980, alſo the place of ♄ is 18^{d} 15′ 9″ ♎, with 2^{d} 17′, North Latitude.

At the time of this Obſervation, the middle motions of ☿ are as followeth.

	S	D	′	″
Middle motion of ☿.	3	9	39	39
Aphelion of ☿.	8	9	20	49
Node Aſcend. ☿.	1	9	31	14
Anomalie of ☿.	7	0	18	50.



A Synopſis of the Calculation.

In the premiſed Diagram, I number the Anomalie of ☿ from P by T to H, 210^{d} 18′ 50″, whoſe Complement to the Circle is the angle P X H 149^{d} 41′ 10″, which given, with D H 38240, and D X 8130, the angle D H X will be 6^{d} 9′ 37″. For,

D H 38240,	4,582518
Sine of the angle D X H 149^{d} 41′ 10″;	9,703065
D X 8130,	3,910090
Sine of the angle D H X 6^{d} 9′ 37″:	9,030637

Com-

Complement of the ſimple Anomalie P X H.	149^d 41′ 10″
Angle X H D Subſtract.	6 9 37
Complement of the Anomalie æquated P D H	143 31 33
Motion of the Epicycle and the Æqnant.	72 56 54

In the Triangle D H N.

I

Summe of D H and H N 38630,	4,587037
Difference 37840;	4,577951
Tangent of 36$_d$ 28′ 27″,	9,868799
Tangent of 35 54 11:	9,859713
Angle HND 72 22 38.	
Angle H D N 34 16.	

II

Sine of the angle H N D 72^d 22′ 38″,	9,979125
D H 38240;	4,582518
Sine of the angle N H D 107^d 3′ 6″,	9,980476
D N 38359:	4,583869

	D	′	″
Complement of the Anomalie æquated P D H.	143	31	33
Angle H D N Adde,		34	16
Complement of the Anomalie Co-æquated P D N.	144	5	49

☿ being Infra-Diacentron, I number the Variation in the upper Semicircle of the Æquant from X to O, then I ſay,

As the Radius X V 90^d,	10,000000	To D X 8130
To the Arch X V 400;	2,602060	Adde X O 382
So the Sine X O 72^d 56′ 54″,	9,980476	D O 8512
To the Arch X O 382:	2,582536	

In the Triangle D N O.

D N 38359		Summe of D N and D O 46871	4,670904
D O 8512	given	Difference 29847;	4,474900
Angle O D N 144^d 5′ 49″		Tangent 17^d 57′ 5″$\frac{1}{2}$,	9,510524
		Tangent 11 39 26	9,314520
Angle D N O reqnired.		Angle DNO 6 17 39$\frac{1}{2}$ The Excentrique Æquat.	

In the Triangle D N A.

Summe of D N and D A 46489,	4,667350
Difference 30229;	4,480424
Tangent 72^d 2′ 54″,	10,489476
Tangent 63 30 54:	10,302550

Optique Æquat. 8 32 0.

Sine of the Complement of P A N 44^d 26′ 11″,	9,845170
D N 38359;	4,583869
Sine of A D H 35^d 54′ 11″,	9,768205
A N 32130:	4,506904

	D	′	″
Excentrique Æquation.	6	17	40
Optique Æquation.	8	32	0
Abſolute Æquation.	14	49	40.

	S	D	′	″
Middle motion of ☿.	3	9	39	39
Æquation Adde.		14	49	40
Motion of ☿ from ☉ in his Orbite.	3	24	29	19
Node Aſcend. ☿ Subſtr.	1	9	31	14
Argument of Inclination.	2	14	58	5

To finde the Reduction.

As the Radius 90$_{d}$,	10,000000
To the Sine of the greateſt Reduction 12′ 30″;	7,560635
So the Sine of the double of the Argument of Inclination 30^{d} 3′ 50″,	9,699808
To the Sine of the Reduction required 6′ 15″:	7,260443

	S	D	′	″
True motion of ☿ from ☉ in his Orbite	3	24	29	19
Reduction Subſtr.			6	15
True motion of ☿ from ☉ in the Ecliptique.	3	24	23	4
Place of the ☉ Subſtract.	7	7	53	29
Anomalie of Commutation.	8	16	29	35.

To finde the Inclination of his Orbite from the Ecliptique.

In the Sphæricall Triangle Q X L (of the ſecond Figure following) is given, (1) the Hypothenuſe Q L 74^{d} 58′ 5″, (2) the angle of greateſt Inclination X Q L 6^{d} 54′, or (in our numbers it is underſtood by the ſide E B) 4594 parts, then to finde the Inclination X L, I ſay,

As the Redius Q E 90^{d},	10,000000
To the greateſt Inclination E B 4594;	3,662191
So the Sine of Q L 74$_{d}$ 58′ 5″,	9,984878
To the Inclination X L 4436.	3,647069

But putting the diſtance of ☿ from the ☉ 32130, for the Radius, the Inclination X L will be but 3728. For,

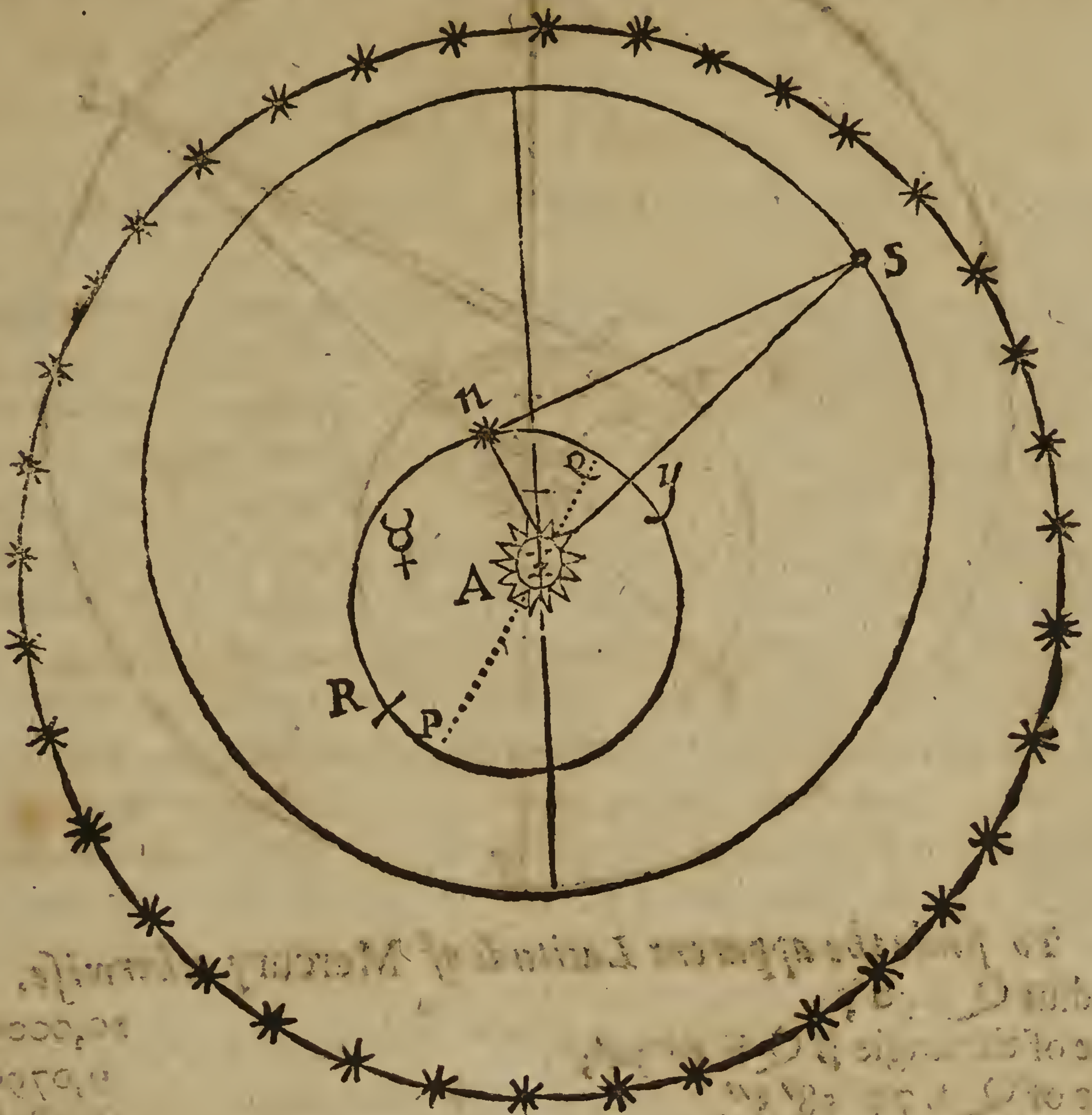
As the Common Radius 38240,	4,582518
To the diſtance of ☿ from ☉ 32130;	4,506904
So X L 4436,	3,647069
To X L 3728:	3,571455

To finde the Diſtance of Mercury *from* Sol *Curtated.*

Having the diſtance of ☿ from ☉ 32130, and the Inclination of his Orbite 3728, his diſtance corrected by Curtatio^{n}, may be obteined in manner following.

Hypothenuſe A L	32130	Summe	35858 ——	4,554586.
Inclination X L.	3728	Difference	28402 ——	4,453348.
			Aggregate	9,007934.
Diſtance of ☿ Curtated	31913		Semiag.	4,503967.

Of the ſecond Inequality of Mercury, *called the Parallax of the Orbe.*



The Anomaly of Commutation is by the foregoing Operation found to be 8^s 16^d 29′ 35″, which I reckon from R, by P, to N, from which deducting the Semicircle R Y 180^d, the Remainder 76 29′ 35″, is the angle Y A N, or S A N. Alſo the diſtance of ☿ from the ☉ A N is 31913, and the diſtance of the Earth from the ☉, A S 98980. Hence the Parallax of the Orbite, or angle A S N is required, as alſo the diſtance of ☿ from the Earth, repreſented by the line S N.

Summe of A S and A N 130893,	5,116916
Difference 67067;	4,826508
Tangent of 51^d 45′ 12″,	10,103343
Tangent of 22 1 21:	9,812935
Angle A SN 18 43 41. Parallax of the Orbe.	
Sine of the angle A S N 18 43′ 41″,	9,506608
A N 31913;	4,503967
Sine of the angle *S* A N 76^d 29′ 35″;	9,987819
S N 96644:	4,985178

	S	D	′	″
Place of ☉ from the Earth	7	7	53	29
Parallax of the Orbe ſubſtract.		18	43	41
Place of ☿ from the Earth.	6	19	9	48.

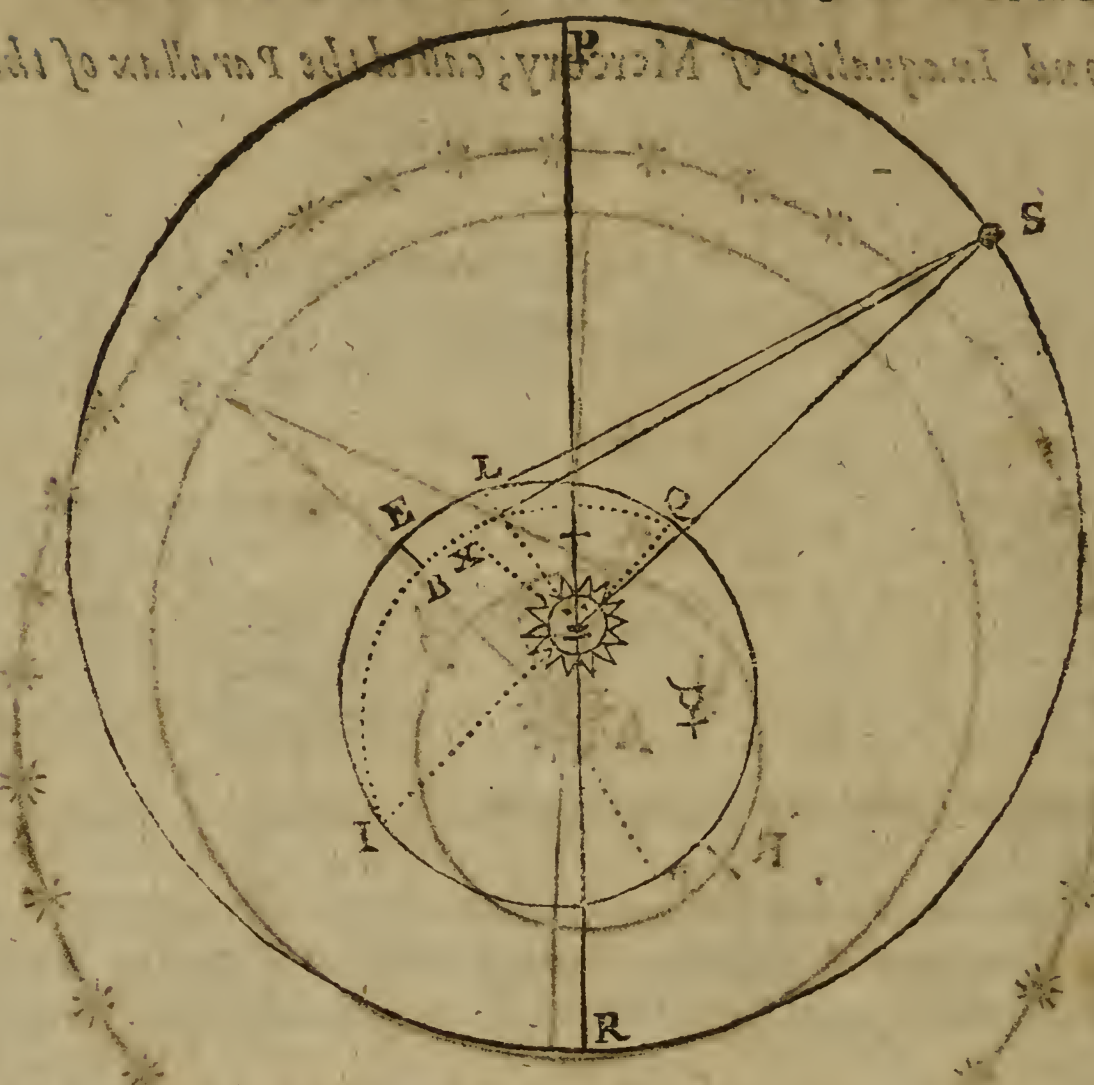
To finde the apparent Latitude of Mercury.

In the Triangle *S* X L is given (1) *S*X 96644: (2) X L 3728. Hence the angle L*S*X is demanded.

As X *S* 96644,	4,985178
To X L 3728;	3,571455
So the Radius 90^d,	10,000000
To the Tangent of the angle L S X 2^d 12′ 32″:	8,586277

Which is the true Latitude of ☿ in reſpect of the Earths poſition at S, and is known to be north, becauſe the Argument of his Inclination is 74^d 58′ 5″, for in all the Planets.

	s	s	s	s	s	s	
If the Argument of Inclination be	0	1	2	3	4	5	The Latitude is North.
	6	7	8	9	10	11	The Latitude is South.



To finde the apparent Latitude of Mercury *otherwiſe.*

Radius Q E 90,	10,000000
Sine of the angle B Q E $6^{d}\ 54'$;	9,079676
Sine of Q L $74^{d}\ 58'\ 5''$,	9,984879
Sine of X L $6^{d}\ 9'\ 46''$:	9,064555
Sine of Elongation $18^{d}\ 43'\ 41''$,	9,506608
Sine of Commutation $76^{d}\ 29'\ 35''$;	9,987819
Co-tangent of Inclination $6^{d}\ 39'\ 46''$.	10,932321
Co-tangent of Latitude $2^{d}\ 12'\ 32''$:	11,413713

Therefore the Latitude of ☿ is $2^{d}\ 12'\ 32''$ North, as before.

Bullialdus fitting his Example in Mercury (*Fol.* 44. *Aſtron. Philolaicæ*) to the time of this Obſervation, he gathereth, that ☿ was in $19^{d}\ 7'$ ♎ with north Latitude $2^{d}\ 15'$, and ♄ in $18^{d}\ 13'$ ♎, with north Latitude $2^{d}\ 9'$: ſo that ☿ was diſtant from ♄ 54′ agreeing with my Calculation, but differing from the place that *Walther* ſets down, $\frac{1}{3}$ of a Degree in Longitude, and $\frac{1}{10}$ of a Degree in Latitude, which is but a little, conſidering the Obſervation was made onely by the bare ſight, for their apparent diſtances being taken by eſtimation, doth make them always appear leſſe then they are, in reſpect of the circumradiancy and explication of their Rayes, which being not at all conſidered by the Obſervator, produceth a little difference, yet not ſo much, as to make any ſenſible alteration, neither can I queſtion the Obſervation as ſhort of truth.

Thus, have I with much plainneſſe and brevity deſcribed, how the Earth, Moon, & other Planets, perform their real & ſimple motions in their peculiar Eliptick-paths, after a moſt ſtately and Harmonious Order, by the alone ſpeculation and knowledge whereof we are enabled to calculate their true Motions, and indeed ſalve, *ad punctum ipſiſſimum*, that wonderfull admired inæquality of Appearance, which formerly puzzled all the Aſtronomers of *Europe*, till ſuch time, as the divine *Urania* ſtirr'd up her ſervant *Copernicus* to free her ſons from the *Peripateticks*, the adventitious figments of mans compoſition, thoſe fictious Circles, and Monſters of Nature, which the Ancients (being deſtitute of better helps, and not knowing the Fountain, from whence did ſpring thoſe ſeeming Directions, Retrogradations, and Stationary Appearances) fondly deviſed, which hath already moſt deſervedly received their confutation in ſundry Tracts already publiſhed, inſomuch, that I ſhall here, ſave my pen that labour; ſuppoſing that thoſe, that know any thing of this moſt noble Science, will willingly imbrace the truth, and free themſelves from thoſe Ægyptian Skars, thoſe Ptolomaick Hypotheſis, which a long time have miſerably defaced the Native Beauty of the divine *Urania. Impoſſibile eſt Excentricorum, & Epicyclorum poſitio, nec aliquus eſt ex Mathematicis adeo ſtultis, qui veram illam exiſtimet. Gal. cap.* 7. And we may not unfitly apply the propheticall ſaying of *Seneca* to our purpoſe. *Veniet tempus quo iſta, quæ nunc latent, in lucem dies extrahet, & longioris ævi diligentia.*

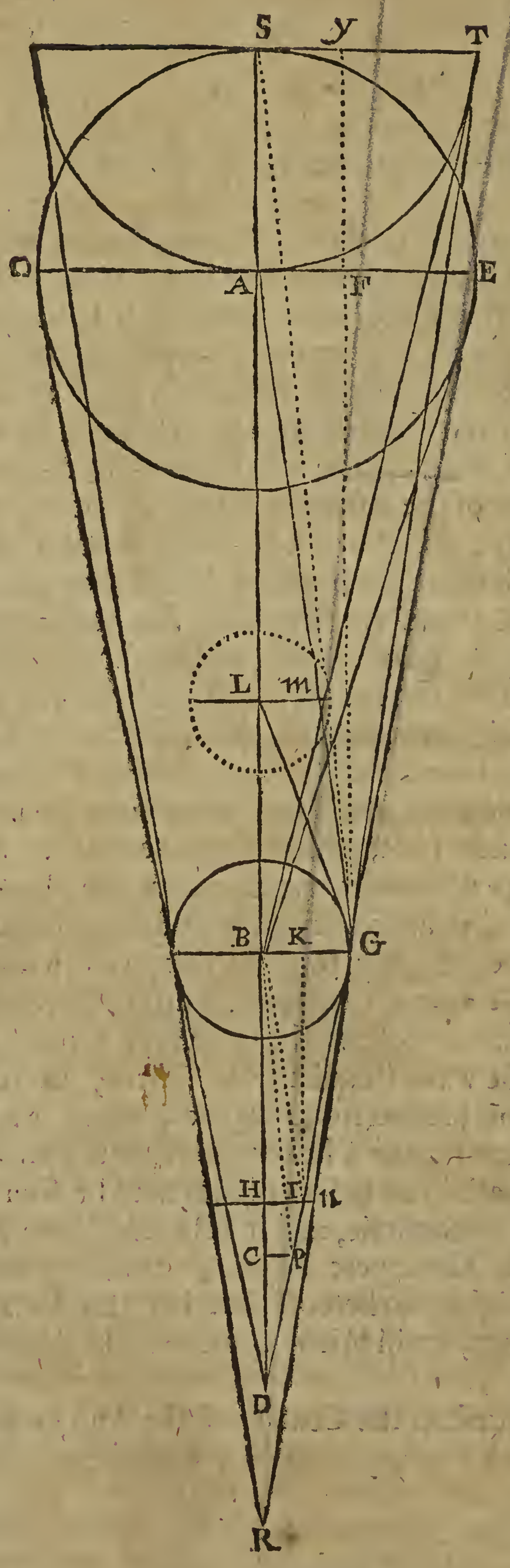
CHAP. XXI.

Of the Semidiameters of the Sun, Moon, and Shadow of the Earth.

COmming now to treat of the Semidiameters of the ☉, ☾, and ſhadow of the Earth, and of their magnitude and proportion one to another, I ſhall, before I enter upon that taske, give you to underſtand, that there hath been great diſſention amongſt Authours, for above theſe 1800 years concerning this particular. The firſt that I read of was a Philoſopher amongſt the Greeks, of great note, and famous for his judgement and learning in the Mathematiques, whoſe name was *Ariſtarcus Samius*. This Authour publiſhed a Book of the particular dimenſions of the ☉ and ☾, wherein he made demonſtration of the diſtance of the Sun, Moon, and Earth, and of their true Magnitudes mutually, which work, though it was a piece eſteem'd moſt rare & excellent in thoſe brutiſh times, yet he deliver'd not the right uſe thereof. After him next followed *Hypparchus*, a man renowmed to this preſent day (whoſe Diagram we ſhall inſert) he thorowly found out its uſe, and was the firſt that publiſhed the ſame, whereby he made better Demonſtration, of the Magnitude and Intervalls of theſe three Bodies, the ☉, ☾, and Earth, then any had done before him, yet (I grieve to ſpeak it) the Book periſhed in thoſe darke times, and had not *Ptolomie* (by the goodneſſe of God) reteined the uſe and demonſtration thereof (in ſome meaſure) in his Almageſt, we might, for ought I know (notwithſtanding the facility and certainty thereof) have waded ſtill in ignorance without it, neither may we think it ſtrange, for we ſee many ſince *Ptolomies* time, that have not had a full apprehenſion thereof, as *Albategnius*, *Alphonſus*, and ſundry others, nay, to go further, we can ſcarce ſay ſo much of thoſe famous Neotericks, *Regiomonte*, *Copernicus*, and *Tycho Brahe*, and albeit *Lanſberge* in his *Uranometria*, pretends to follow the ſame, yet I may ſay without wrong to his profeſſion (for indeed he was a ſingular good Divine) he hath made as ſilly a demonſtration of it, as any of his predeceſſors, but the learned *Kepler* fully underſtood the proper uſe thereof, and hath made a better and cleerer demonſtration of it, then any that I have met with, hath done before him, as may be ſeen in thoſe his learned Epitomes of his Copernican Aſtronomie, and in his Rudolphine Tables, whoſe demonſtration is likewiſe reteined of the expert *Bullialdus* in his *Aſtronomia Philolaica*, who hath much amplified the right uſe thereof; But leſt this Relation ſhould be thought ſuperfluous, or unneceſſary, I will briefly come to make demonſtration thereof, and then to practiſe.

In the annexed Diagram, obſerve that A repreſents the Center of the Sun, when he is Perig.

L. The Center of the Moon.
B. The Center of the Earth.
S. The Center of the Sun when he is Apog.
H B I. The apparent Perigæan Semidiameter of the ſhadow.
C B P. The apparent Apogæan Semidiameter of the ſhadow.
A B E, or A G E. The apparent Semidiameter of the Sun, when he is Perig.
S B T, or S G T. The apparent Semidiameter of ☉ in his Apog.



A E or S T, the true Semidiameter of the ⊙.
D, the Vertex of the Conicall point of the Earths ſhadow when the ⊙ is Perig.
R, the ſaid point when the ⊙ is Apog.
B D G, the Semi-angle of the Cone of the Earths ſhadow, when the ⊙ is Perig.
B R G, the Semi-angle thereof when he is Apog.
B D R, the Axis of the ſhadow.
L M, the true Semidiameter of the ☾.
L B M, the angle of her apparent Semidiameter.
B A G, the Horizontall Parallax of the ⊙, when he is Perig.
B S G, the Horizontall Parallax of the ⊙ when he is Apog.
B L G, the Horizontall Parallax of the ☾.
Laſtly, let the lines G Y, and I K, be drawn parallel to the line of the Axis D S. Hence it followeth,

1 That the Horizontall Parallax of the ⊙, and Semi-angle of the Cone of the Earths ſhadow, are equall to the apparent Semidiameter of the ⊙.

2 That the Semi-angle of the Cone of the Earths ſhadow, is ever leſſe then the Horizontall Parallax of the Moon, and the Difference of them is the apparent Semidiameter of the Earths ſhadow.

3 That the Aggregate of the apparent Semidiameter of the ⊙, and ſhadow of the Earth, are equall to the Aggregate of the Horizontall Parallax of the ⊙ and ☾, ſo that out of the Aggregate of the Horizontall Parallax of the ⊙ and ☾, ſubſtracting the apparent Semidiameter of the Sunne, the Reſidue will be the apparent Semidiameter of the Earths ſhadow *in Loco tranſitus Lunæ*.

CHAP. XXII.

Having the true Semidiameter of the Sun, *and his Diſtance from the* Earth, *to finde his apparent Semidiameter.*

THe true Semidiameter of the Sun is 478 ½ parts, which being known, with his Diſtance from the Center of the Earth, his apparent Semidiameter may ſpeedily be obteined. For exerciſe ſake, let us imagine the ⊙ be Apog. and his apparent Semidiameter be required: His Apogæan diſtance from the Center of the Earth is 101803, therefore in the Triangle B S T is given.

1 BS 1018030 } given { B S 1018030, 6,007760
2 T S 4785 } given { T S 4785; 3,679882
3 Angle S 90d. } Radius 90d, 10,000000
Angle S B T required. { Tangent of the angle S B T 16′ 9″: 7,672122

And this is the apparent Semidiameter of the Sun, when he is fartheſt remote from the Center of the Earth, which is alſo equall to the angle S G T.

Again, admit the Sun be neereſt the Center of the Earth, (that is when the Earth is perig.) at which time the Centrical Intervall of theſe two Globular Bodies is 98229, this known, the operation is performed as before.

The Logarithme of A B 98229|0, 5,992240
The Logarithme of A E 478|5; 3,679882
The Radius 90d, 10,000000
The Tangent of A B E 16′ 45″: 7,687642

Which 16′ 45″ is the apparent Semidiameter of the Sun, when he is neereſt to the Earth, exceeding his Apogæan Semidiameter 36″, which is cauſed by the variation of the Diſtance of theſe two Bodies.

CHAP. XXIII.

To finde the apparent Semidiameter of the Moon.

THe true Semidiameter of the Moon (as I have ofen experimented both by Eclipſes of the ☉, and her paſſage by the fixed Stars) is 19′ 9″, or $19\frac{15}{100}$, underſtood in the former Figure by L M, which being known, with her diſtance from the Earth, her apparent Semidiameter may be acquired according to the Analogie before laid down in the former Chapter, therefore, for numerall illuſtration, let us imagine the Moon be Apog. or fartheſt removed from the Earth, where her diſtance is 4225. Now if we prolong this diſtance with two Cyphers, we may alſo prolong the true Semidiameter of the Moon 19, with the Numerator of the Fraction 15, as in the following work.

In the Triangle B L M.

1 B L 4225.00 } given { B L 4225.00, 5,625827
2 L M 19.15 } given { L M 19.15; 3,282169
Angle L B M required } Radius 90d, 10,000000
{ Tangent of the angle L B M: 6,656342
Whoſe Arch is 15′ 35″, which is the apparent Semidiameter of the Moon when ſhe is Apog.

When the Moon is Perig. or diſtant from the Earth but 3873.

Analog. { B L 387300, 5,588047
L M 1915; 3,282169
Radius 90d, 10,000000
Tangent of the angle L B M 17′ 0″: 7,694122

After this manner may the apparent Semidiameter either of the ☉ or ☾ be obteined at any moment, which yields aboundance of facility as well as dexterity, by help of my Numbers, which are very exact and exquiſite in all Aſtronomicall operations.

CHAP. XXIV.

1 *To finde the apparent Semidiameter of the Earths ſhadow, the Longitude thereof, Semi-angle of the Cone, &c.*

FRom the Aggregate made of the Horizontall Parallax of the Sun and Moon, ſubſtract the apparent Semidiameter of the Sun, the Reſidue is the apparent Semidiameter of the ſhadow at the time propoſed, according to the 3 Prop. of the 21 Chapter.

When the Sun and Moon are both Apog. *or* Aphelion.

The Horizontall Parallax of the ☉ is	2′	18″
The Horizontall Parallax of the ☾.	55	43
Aggregate	58	1
The Semidiameter of ☉ Subſtr.	16	9
Semidiameter of the Earths ſhadow.	41	52

When the Sun and Moon are both Perig.

The Horizontall Parallax of the ☉ is	2	23
The Horizontall Parallax of the ☾.	60	49
Aggregate	63	12
The apparent Semidiameter of ☉ Subſtr.	16	45
The apparent Semidam. of the ſhadow.	46	27.

2 *To finde the Semi-angle of the Cone of the Earths ſhadow.*

In the former Example the apparent Semidiameter of the ☉ understood by the angle S G T is	16′	9″
The Horizontall Parallax of ☉ BSG, or (which is all one) SGY Subſtr.	2	18
Remains the angle Y G T.	13	51

Which by reaſon of the Parallelleſme of the lines B S, G Y, is equall to the angle S R T, which is the Semi-angle of the Cone of the Earths ſhadow.

In the latter Example the angle of the apparent Semid. of ☉ A G E is	16′	45″
The Horizontall Parallax of the ☉ B A G, or A G F Subſtr.	2	23
Remaines the Semiangle of the Cone F G E, or B D G.	14	22

3 *To finde the Longitude of the Earths ſhadow.*

In the Triangle B D G, of the former Diagram is given, (1) B G the Semidiameter of the Earth 68½, (2) the angle B G D 89 45′ 38″. Hence the Side B D is demanded.

Radius 90ᵈ,	10,000000
Tangent of B D G 89ᵈ 45′ 38″;	12,378920
B G 68½,	1,835690
B D 16391: 14′ 22″	4,214610

Which ſide B D is the Longitude of the Axis of the Earths ſhadow, from which taking B H 3873 (the Diſtance of the Moon from the Earth) it leaveth D H 12518.

4 *To finde the true Semidiameter of the ſhadow or ſide* H I.

In the Triangle D H I, the angle D is 14′ 22″, and the ſide D H 12518, the ſide H I being demanded.

Analogie	Radius 90ᵈ,	10,000000
	Tangent of D 14′ 22″;	7,621080
	D H 12518,	4,097535
	C I 52 $\frac{31}{100}$:	1,718615

Or in the Triangle B H I, having B H 3873, and the angle H B I 46′ 27″, the ſide H I, according to the ſame proportion, will be found (as before) 52 $\frac{31}{100}$.

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2 That the ☉ is greater then the Earth 343 times.

Laſtly, that the ☉ exceedeth the ☾ $15765\frac{103}{300}$ times, for according to this demonſtration the Cube of the ☉ is 4,741,632,000, and the Cube of the ☾ is 300,763.

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CHAP. XXVI.

Of the Magnitude and Proportion of the five Planets Saturn, Jupiter, Mars, Venus, *and* Mercury.

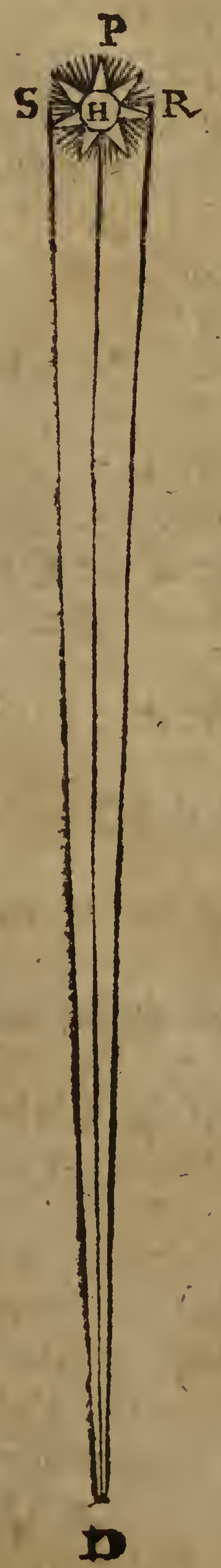
ALthough it be a matter of great labour and difficulty to obtein the apparent Diameters of the Planets and Stars with Inſtrument, in reſpect of the Connexion of the Cauſes before mentioned, yet have I (with all the heed and circumſpection I could poſſible) endevoured to remove the ſame, to finde out their true appearances; and I ſhall here deliver nothing, but that which obſervation hath for many years together confirm'd unto me.

The apparent Semidiameters of theſe five Planets in their mean Diſtance from the Earth repreſented in the following Figure by the angle H D R.

	′	″
♄	0	32
♃	0	57
♂	0	25
♀	0	48
☿	0	29.

Now, ſome perhaps, there may be, that may here accuſe me of errour, ſith *Tycho*, and other famous Authours make their apparent Semidiameters (in their mean diſtance) far greater, to which I anſwer, that the Circum-radiancie and Periwigge of their beams, making them appear greater then they are, did thereby deceive the Obſervators, as they who make Obſervation with the Galilean Glaſſe will acknowledge.

To finde the true Semidiameters of the Planets.



In the annexed Scheme, let P R S repreſent the Globular body of any of the five Planets, H R the Semidiameter, D the Earth, and D H the Diſtance between the Planet and the Earth. Theſe things premiſed, we come to practiſe. Therefore in the Triangle D H R is given.

1 D H, the Diſtance of a Planet from the Earth.

2 The angle H D R, the apparent Semidiameter.

Hence the true Semidiameter H R or H S may thus be obteined.

In ♄.

Radius 90^d,	10,000000
Tangent of angle H D R 0′ 32″;	6,187682
D H 952500,	5,978865
H R 147 *ferè:*	2,166547

In ♃.

Radius 90^d,	10,000000
Tangent of the angle H D R 57″;	6,439972
D H 522000,	5,717671
H R 144:	2,157643

In ♂.

Radius 90^d,	10,000000
Tangent of H D R 25″;	6,074651
D H 152200,	5,182415
H R 18:	1,257066

In ♀.

Radius 90^d,	10,000000
Tangent of H D R 48″;	6,365163
D H 100000,	5,000000
H R $23\frac{1}{3}$:	1,365163

CHAP. XXV.

Of the Proportion and Magnitude of the three great Bodies, the Sun, Moon *and the* Earth.

IT is a piece of no ſmall difficulty to finde the true magnitude of the Cœleſtiall Bodies, in regard their apparent magnitude is ſo various to be obteined with Inſtrument, for often times it hapneth, that that which the eye apprehends plain and certain, is for the Interpoſition of other Cauſes moſt uncertain, and ſo procreates an Obſervation doubtfull and erroneous, and inſufficient whereon to raiſe a Geometricall Edifice: and the reaſon hereof is, becauſe the eye receives the ſpecies of things in a different kinde, ſometime apprehending the Object diſtinctly, ſometime confuſedly; and ſo the ſpecies may be varied both in reſpect of the Colour and Magnitude. Secondly, the Diſpoſition of the vaporous Ayre is ſuch, that the bright Rays of the Stars penetrating the ſame, doth for the moſt part make them appear far greater then they are (yet if the Ayre be very pure and thin, then may their apparent Diameters be taken with leaſt errour) but the apparent Semidiameters of the Sun, and Moon, and their Proportion one to another, is not onely to be obteined with Inſtrument, but by Eclipſes, eſpecially of the Sun, ſeeing that ſometime its totall, and again ſometime partile, albeit the viſible Conjunction of the Luminaries, be centuall. Laſtly, ſeeing the true and apparent Semidiameters of the Luminaries may (notwithſtanding the intervention of the Cauſes before ſpoken of) be truly obteined, wee ſhall not retard your longing expectations with any tedious Preamble, but briefly come to ſhew you how to enquire and ſearch out the true magnitude of theſe Bodies, and their Proportions mutually, ſo neer as the Capacity of weak man, can by this Art determine.

1 { Cube of the ☉ Semidiameter 478.5 is 109558436.625.
Cube of the Earths Semidiameter 68.5 is 321419.125.

Now dividing the Cube of the Suns Semidiameter by the Cube of the Earths Semidiameter, we ſhall finde it conteined therein $340\frac{2759}{3214}$ times, and therefore the Sun is ſo many times greater then the Earth.

2 { Cube of the ☉ Semidiameter 478.5 is 10958436.625.
Cube of the ☾ Semidiameter 19.1$\frac{1}{2}$ is 7022.735.

Making diviſion, as before, we ſhall finde the Cube of the ☾ Semidiameter, to be conteined in the Cube of the ☉ Semidiameter $15600\frac{37569}{70227}$ times.

3 { Cube of the Earths Semidiameter 68.5 is 321419.125
Cube of the Moons Semidiameter 19.1$\frac{1}{2}$ is 7022.735.

Dividing, as before, the greater by the leſſer, wee ſhall finde the Cube of the ☾ to be conteined in the Cube of the Earth $45\frac{54}{70}$, and ſo many times is the Earth greater then the ☾.

From the Hypotheſis of *Ptolomie*, it followeth, that the ☉ is greater then the Earth 166 times, and that the ☾ is leſſer then the ☉ 6648.

Copernicus would have the ☉ to be greater then the Earth 162, and the ☾ to be leſſe then the ☉ 7000 times.

Tycho Brahe deprehends the ☉ to be greater then the Earth about 140 times, and the ☾ to be leſſe then the Earth 42 times.

C. S. Longomontanus obſerves, that the ☉ is bigger then the Earth 196 times, and that the ☾ is 10000 times leſſe then the ☉.

Lanſbergius (comming neerer the truth) proves by Demonſtration that the ☾ is leſs then the Earth $45\frac{1}{2}$ times, that the ☉ is greater then the Earth 434 *ferè*, and that the ☉ is greater then the ☾ 19770 times.

But none of theſe Magnitudes and Proportions are conſentaneous to truth, neither agreable to their own Hypotheſis, and therefore not to be credited.

But the late, famous and expert French-man *Bullialdus*, in the 2 Chap. of the 6 Book of his *Aſtronomia Philolaica*, proves that the Cube of the Earth is to the Cube of the ☾, as 13,824,000: to 300,753, and therefore the Earth muſt contein the ☾ $45\frac{29}{33}$ times.

In ☿.

Radius 90′,	10,000000
Tangent of the angle H D R 29″;	6,145087
D H 100000,	5,000000
H R 14:	1,145087

Of the Magnitude and Proportion of the Planets to the Earth.

According to the 18 Propoſition of the 12 Book of EUCLIDS Elements of Geometrie, a Sphære, or a Globe bears a triple Proportion to its Diameter, or to its Semidiameter, according to the 19 of the 5 Book: *Nam ut totum ad totum, ita ablatum ſe habuerit ad ablatum.* Therefore, as the Cube of the Semidiameter of the Earth, is in proportion to the Cube of the Semidiameter of the Starre, the ſame Proportion bears the Globe of the Earth, to the Globe of the Starre,

To finde their Magnitude and Proportion to the Earth.

It is no more but to ſeeke how many times the Cube of the one is conteined in the Cube of the other.

♄	Cube of ♄ Semidiameter 147 is	3176523
	Cube of the Earths Semid. 68½ is	321419

Dividing the Cube of ♄ by the Cube of the Earth, the Quotient will be $9\frac{283}{3176}$, and ſo much is ♄ greater then the Earth.

♃	Cube of ♃ 144 is	2985984
	Cube of the Earth 68½ is	321419

Making Diviſion, as before, the Quotient will be $9\frac{932}{29859}$, which is the quantity ♃ exceeds the Earth.

♂	Cube of the Semid. of the Earth 68½ is	321419
	Cube of the Semidiameter of ♂ is	5832

Dividing the greater by the leſſer, we ſhall finde that ♂ is leſſer than the Earth $55\frac{66}{321}$ times.

♀	Cube of the Earths Semidiameter 68½ is	321419
	Cube of ♀, her Semidiameter 23 is	12167

And becauſe the Cube of ♀ is conteined in the Cube of the Earth $26\frac{5077}{12167}$, it ſhewes that ♀ is ſo many times leſſe than the Earth.

☿	Cube of the Earth 68½	321419
	Cube of ☿ 14	2744

By making partition as before, wee ſhall finde that ☿ is leſſe than the Earth $117\frac{371}{2744}$ times.

CHAP. XXVII.

Having the true Semidiameter of a Planet, and his Diſtance from the Earth to finde his apparent Semidiameter.

IN the 26 Chap. preceding, I have according to my own proper Obſervations, ſet down the true Semidiameters of the Sun, Moon, and other Planets, and have ſhewed in the former Chapters, how that at any time given, you may compute their Diſtance from the Center of this earthly Globe, with much certainty (be they poſited in any part of their Orbs;) it cannot therefore be unſeaſonable now to treat a little of their apparent Magnitudes, becauſe I would not have any thing left wanting, or obſcure that may be thought neceſſary, or pertinent, and although the judicious need no farther Directions, then I have given in the 22 Chap. where I have treated of the apparent Semidiameters of the Sun, and of the Moon, his Siſter, yet ſhall I here in the other Planets make further illuſtration, by adding Examples.

In ♂.

When ♂ is in his mean Diſtance from the Earth, which conteins 152040 parts, his apparent Semidiameter is 25″, but being either neerer, or farther diſtant from the Earth, his apparent Semidiameter is increaſed, or diminiſhed, accordingly, as all the other Planets are, for the neerer the Object is, the greater doth it appear, and ſo the leſſer when it is far diſtant, as appears by the Opticks. Now ſuppoſe the Diſtance given of ♂ from the Earth be 56240 parts, and his apparent Semidiameter in that diſtance be required. His true Semidiameter according to the 26 Chap. is 18 parts, which known, I repair to the former Diagram of the 26 Chap. where we have given, (1) the Diſtance of ♂ from the Earth, repreſented by the line D H, 56240: (2) the true Semidiameter of ♂, H R 18. Hence to finde the angle of his apparent Semidiameter, H D R, I ſay,

As D H 56240,	4,750045
To H R 18;	1,255272
So the Radius 90ᵈ,	10,000000
To the Tangent of the angle H D R 1′6″:	6,505227

Which 1′ 6″ is the apparent Semidiameter of ♂, and therefore his apparent Diameter is at the ſame time 2′ 12″.

In ♀.

Again, ſuppoſe ♀ be from the Earth 44100, and her apparent Semidiameter be required: having therefore her Diſtance, and her true Semidiameter, according to the 26 Chap. $23\frac{1}{5}$, the Analogie will be the ſame as before, for in the ſame Figure I ſay,

As D H 44100,	4,644438
To H R $23\frac{1}{5}$;	1,365588
So the Radius 90ᵈ,	10,000000
To the Tangent of the angle H D R 1′48″:	6,721150

Therefore the Semidiameter apparent in the Diſtance given is 1′48″, and her Diameter apparent 3′ 36″, whereas her Diameter apparent in her middle Diſtance is but 1′ 36″, ſo that in the given Diſtance, her Semidiameter exceeds the mean 2′, and therefore it is, that when ſhe is in this Diſtance, and neer to the Earth, ſhe hath been oftentimes taken for a Comet, as in 1630, and in 1649, when being Occidentall, ſhe appeared of unuſuall magnitude, to the admiration of the Beholders, who were ignorant of the cauſe thereof.

CHAP. XXVIII.

Having the Diſtance of Sun, Moon, *or other Planets from the* Earth, *how to reduce the ſame into* German *or* Italian *miles.*

THe true Semidiameter of the Earth in German miles is $859\frac{1}{2}$ *ferè*, accounting the Circumference 5400, but we ſhall here account 860, according to common Computation, then looke what Analogie $68\frac{1}{2}$, (which is the true Semidiameter of the Earth in our Numbers) bears to 860, the ſame Proportion bears the Diſtance of the Planet given in our Numbers, to the Diſtance in miles required.

Admit ♄ be in his mean diſtance from the Earth, where he is 952500 parts diſtant and it be required to reduce the ſame into German miles, I therefore multiply the Semidiameter of the Earth in miles, *viz.* 860, by the Diſtance given 952500, and the Product 819150000, I divide by $68\frac{1}{2}$, and I find in the Quotient $11958394\frac{11}{68}$, and ſo many German miles is ♄ diſtant from the Earth, when he is in his mean diſtance, then if you would reduce theſe German miles into Italian, or Engliſh miles, it is no more but to multiply the number of German miles given, by 4, (becauſe one German mile makes four Italian miles) and the Product comming of that Multiplication, wil be the diſtance in Italian miles, which are in a manner the ſame our Engliſh miles are. As in this example, the diſtance given in German miles is 11958394. which multiplied by 4, procreates 47833576, and ſo many Italian miles is he from the Earth in his mean Diſtance.

After the ſame manner may the Diſtance of any of the other Planets be obteined, either from the Sun, or from the Earth, having their Diſtances given in ſuch parts, whereof the Radius of the Earths Orbe is 100000, which muſt be enquired according to the Doctrine of Triangles, as appears in ſundry Chapters of this Book, where I have plainly declared how their Diſtances in ſuch parts may be found, either from the Sun, or from the Center of the Earth at any time propoſed.

CHAP. XXIX.

Of the Eclipſes of the Sun *and* Moon, *to calculate their Quantity, and to finde the Minutes of Incidence and Emerſion Trigonometrically.*

IT is not my intention here to treat methodically of the Eclipſes of the Sun and Moon, in regard that Task belongs properly to the fourth Book, where we handle their motions and paſſions more ſuccinctly then here is, or can be done, yet I ſhall briefly here, ſo far as appertains to the Theorique part thereof, give you the Fundamentalls of what I ſhall there deliver.

To calculate the quantity of the Moons *Eclipſe.*

In the Eclipſe of the Moon to be 1653, March 3^{d} 15^{h} 52′ 39″, the Semidiameter of the Moon is 15′ 38″, and the *Pars deficiens* 48′ 45″, therefore I ſay,

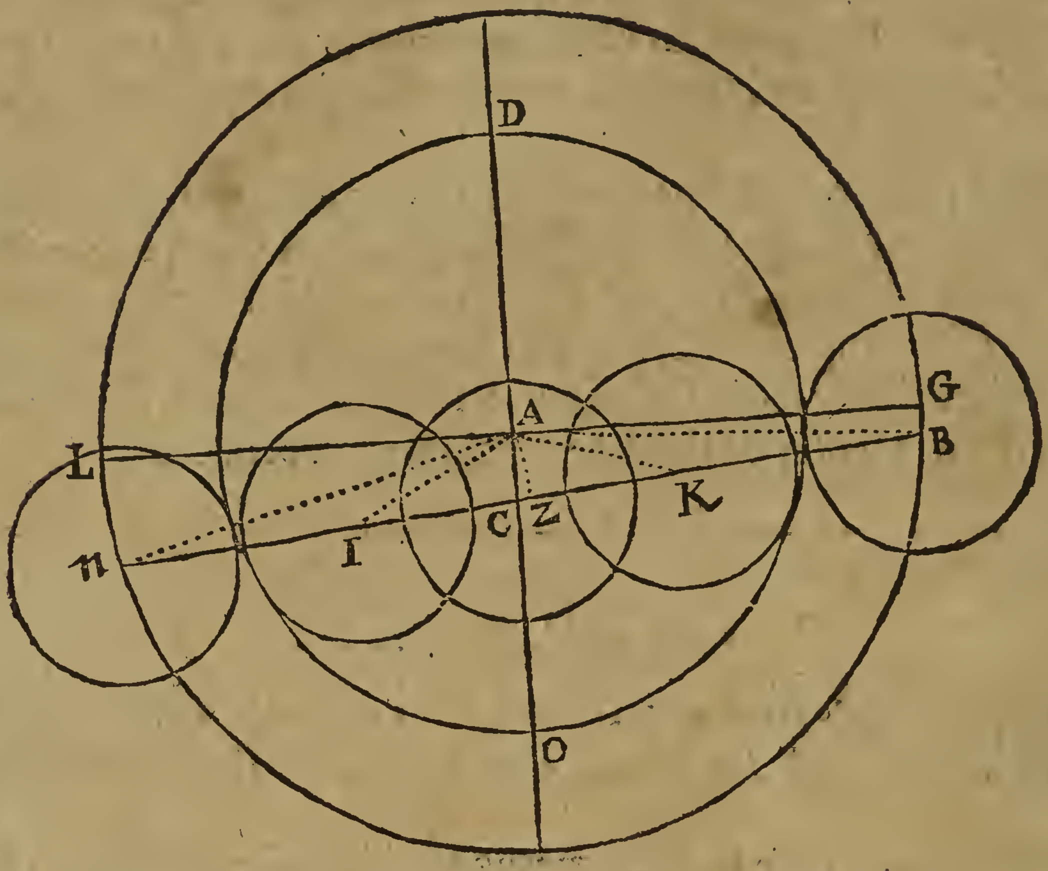
As the Diameter of the Moon 31′ 16″ (or 1876″,)	3,273233
To 12 Digits (or 720′)	2,857332
So is 48′ 45″ (or 1925″)	3,466126
To 18^{d} 42′ 36″ (or $1122\frac{36}{60}$)	3,050225

Again, in the Eclipſe of the Sun to be 1654 Auguſt 2^{d} 8^{h} 55′ 14″ *A. M.* the apparent Semidiameter of the Sun is 16′ 14″, and the *Pars deficiens* 27′ 6″, *Ergò*,

As the Diameter of the ☉ 32′ 28″ (or 1948″)	3,289589
To 12^{d} (or 720′)	2,8573 2
So the *Pars deficiens* 27′ 6″ (or 1626″)	3,211120
To 10^{d} 0′ 59″ (or $600''\frac{59}{60}$)	2,778863

To finde the minutes of Incidence and Emerſion, as alſo the Minutes of the half tarrience of the Moon, *in the ſhadow of the* Earth.

For the more full underſtanding hereof, I have ſet down the two following Schemes, the former whereof ſerves for the ☾ Eclipſe, and the latter for the ☉ Eclipſe, wherefore in the former obſerve, that,



G A L, repreſents the Ecliptique.
B K C I N, the way of the ☾.
B K, the minutes of Incidence.
I N, the minutes of Emerſion.
K Z, the minutes of her halfe tarrience in the ſhadow.
B Z, the minutes of Incidence and half tarrience together, being equall to Z N.
Hence in the Rectangle Triangle A Z B is known.
1 The Latitude of the ☾, 8′ 13″ (or 513″) underſtood by the ſide A Z.
2 the Hypothenuſe B A, the ſumme of the Semidiameters of the ☾, and the ſhadow 57′ 18″ (or 3438″)
Then according to the 1 Book 2 Chap. is given B Z 56′ 40″, and K Z 24′ 35″.

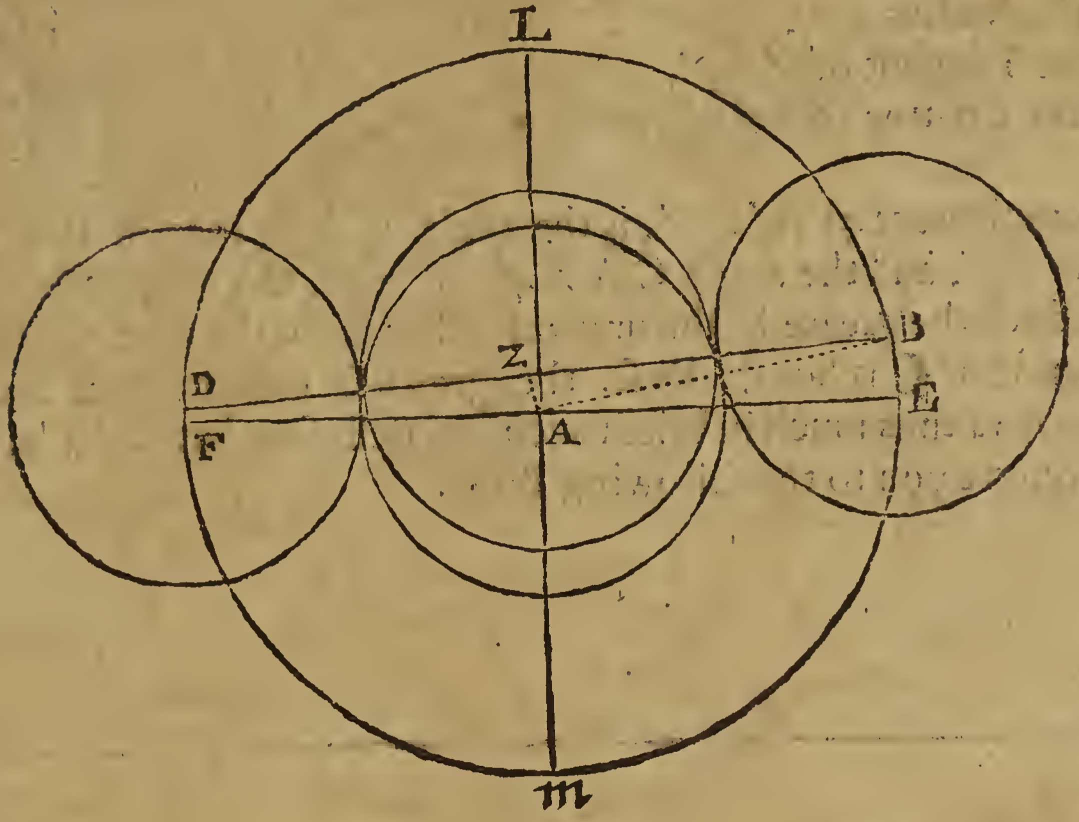
	Hypothenuſe A B	3438	
	Side A Z	513	
	Summe	3951	3,596707
	Difference	2925	3,466126
		Aggregate	7,062833
Side B Z 56′ 40″ (or 3400″)		Semiaggr.	3,531416

Then in the Triangle A Z K is known,
1 The Hypothenuſe A K, the Difference of the Semidiameter of ☾ and ſhadow 26′ 2″.
2 The ſide A Z, the Latitude of the ☾ 8′ 13″.
Hence the ſide K Z is thus found.

	Hypothenuſe A K	1562	
	Side A Z	513	
	Summe	2075	3,317018
	Difference	1049	3,020775
		Aggregate	6,337793
Side Z K 24′ 35″ (or 1475″)		Semiaggr.	3,168896

The minutes of Inſidence and half tarrience together are 56′ 40″, and the minutes of her half tarrience in the ſhadow 24′ 35″, which being taken out of 56′ 40″, leaveth B K 32′ 5″, which are the minutes of Incidence.

In



In the ☉ Eclipſe before mentioned to be 1654 *Auguſt* 2, the Summe of the Semidiameters of the ☉ and ☾ is 32′ 46″ (repreſented in the adjunct Diagram by the ſide B A) and the Latitude of the Moon ſeen (underſtood by Z A) is 5′ 40″.

Therefore in the Rectangle Triangle B Z A, having A B, and A Z given, the ſide B Z will be found to be 32′ 16″.

For the Analogie is as before.

Summe of the Semidiam. ☉ and ☾, A B 1966
Latitude of the ☾ ſeen A Z 340
Summe 2306 —— 3,36286
Difference 1626 —— 3,21112
Aggregate 6,57398
Minutes of Incidence B Z 32′ 16″ (or 1936″.) Semiaggr. 3,28699

CHAP. XXX.

Of the Reduction of time from the true ☍, or ☌ ☉ ☾, to the greateſt Obſcuration.

THe true or apparent ☌ or ☍ ☉ ☾ differeth ſometime (though not much) from the greateſt Obſcuration, for one cauſe thereof is the difference of the place of the ☾ in her Orbite from her place in the Ecliptique, which ever differ, unleſſe the ☾ be in her Nodes or Quarters, the other ariſeth from the inclination of the way of the ☾ to the Ecliptique, when ſhe is in the ſhadow of the Earth.

As in the former Figure of the ☾ Eclipſe, the Latitude of the ☾ A C is 8′ 3″ *S. D.* and her diſtance from her Node 1^{d} 38′ 10″, therefor her Reduction is 24″ to be ſubſtracted from her place in her Orbite, and ſo much is the ☾ from the true ☍ ☉, which divided by the hourly motion giveth 53″ to be added, ſo that the true ☍ ☉ ☾, is 15^{h} 54′ 17″. But how the greateſt Obſcuration differeth from the true Oppoſition, I ſhall here ſhew. In the Figure of the ☾ Eclipſe the line C L repreſents the Ecliptique, which cuts the line D O with right angles in the point A, which is the oppoſite point to the ☉, but the line B Z N is the way of the ☾, and becauſe her latitude is 8′ 33″, and her Diſtance from her Node 1^{d} 38′ 10″, the angle A C Z will be 85^{d} 0′ 18″, for,

As

As the Tangent of 1^{d} 38′ 10″,	8,455808
To the Radius 90^{d},	10,000000
So the Tangent of 8′ 33″,	7,395675
To the Co-ſine of 85^{d} 0′ 18″:	8,939867

Whoſe Complement 4^{d} 59′ 42″, is the angle C A Z, then in the Triangle C A Z, having A C 8′ 33″, and the angle C A Z 4^{d} 59′ 42″, the other ſide C Z will be 45″, and ſo much doth the greateſt Obſcuration differ from the true Oppoſition, and becauſe the latitude of ☾ is South Deſc. the greateſt Obſcuration antecedes the true Oppoſition. And thus much in brief touching Eclipſes, but for a more methodicall Doctrine, I referre you to the following Book.

The end of the third Book.

HARMONICON COELESTE:

THE FOURTH BOOK.

Conteining the practicall part of *Aſtronomie*, or
Doctrine of the Second Motions: Wherein is conteined new Tables
of the Middle Motions and Æquations of all the Planets,
with their uſe, whereby their Equall and Apparent
Places may ſpeedily be acquired and found
out to any time, either paſt,
preſent, or to come.

Calculated (by the Theorie of the AUTHOR,)
according to the Doctrine of the Third Book, And compared
throughout with the admired Obſervations of that
Noble *Dane* *TYCHO BRAHE.*

*The Radix of the Middle Motions being accommodated to the Meridian
of the moſt famous City of* *LONDON:*

Whoſe		is	d	′
	Longitude		21	00
	Latitude		51	32

By VINCENT WING. *Mathemat.*

---

*Cœli enarrant gloriam Dei fortis, & opus manuum ejus indicat
expanſum eorum.* Pſal. 19. verſ. 2.

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* * *

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Company of STATIONERS, 1651.

HARMONICON COELESTE:

The Fourth Book:

CHAP. I.

Of the Epocha *or* Radix *of the middle motions of the* Planets *and* Stars, *and of the* Æquation *of time for the* Difference *of* Meridians.

FOraſmuch as all Aſtronomers in their Tables do ever apply the Radix or Epocha, of the middle motions to ſome certain and definite Meridian, paſſing over the Superficies of the Terreſtiall Sphære, as alſo account their equall Courſes and Revolutions from ſome known point of time, wherein ſome memorable event hath happened, as from the Creation of the World, from the Floud, from the Birth of Chriſt, or from the death of ſome great Prince, as *Nabonnaſſor*, *alias Nabuchodonoſor*, *Alexander*, *Julius Cæſar*, and others. But our Tables of the Cœleſtiall motions take their beginning from the Meridian of the firſt day preceding the Calends of January next following after Chriſts Nativity, and are accomodated to the Meridian of the famous City of *London*, whoſe Longitude is 21 degrees, reckoned from the Canarie, or Fortunate Ilands, ſcituate in the Weſt, from which all Geographers, do number the Longitudes and Meridians of Cities and Places upon the Earth, therefore thoſe places then, that are ſcituate under the Meridian of *London*, have no need of this Æquation for the difference of Meridians, but they who live under other Meridians, cannot uſe our Tables aright, except they firſt æquate the time for the ſaid difference: for they who are removed from the Meridian of *London* towards the *Eaſt*, number more houres in the Obſervation of the appearance of the Cœleſtiall Bodies, then thoſe do at the ſame moment who are more *Weſt*, becauſe, that when the Sun is in our Meridian, it is removed from theirs towards the *Weſt*, and therefore if the place be *Eaſt* of *London*, adde to the time given, but if it be *Weſt*, make Subſtraction, according to the difference of Longitude, allowing 15^{d} to an hour, and $4'$ to a Degree, ſo will the Summe, or Difference be the time æquated to the Meridian of *London*. But becauſe the Reader may ſpeedily make the ſaid Reduction, I have added a Catalogue of many of the chiefeſt Cities in divers Regions, having ſet down the Latitude, and difference of Meridians in time, together with the notes of Addition and Subſtraction, which known, obſerve.

1 If it be required to reduce the time given under the Meridian of *London*, to ſome other Meridian, ſeek the place deſired in the Catalogue of Cities; and the Difference of time there found, either adde, or ſubſtract to or from the time given at *London*, according as the titles of Addition and Subſtraction ſhew, for ſo will the time be reduced to the Meridian of the other place, that was required.

2 If the time given, be under ſome other Meridian, its then requiſite (that the middle motions may aright be obteined) to reduce the ſame to the Meridian of *London*, and therefore ſeeke the Place given in the Catalogue of Cities, and the difference of time there found, contrary to the Title, is to be added, or ſubſtracted from the time there given.

EXAMPLE 1. Suppoſe the time given of the middle of the Moons Eclipſe be at *London*, at 10·0′ *P. M.* and it is required to reduce the ſame to the Meridian of *Uraniburge*, I therefore ſeek *Uraniburge* in the Catalogue of Cities and Places, againſt which I finde 50′ with the letter A annexed, therefore I conclude, that the middle of the Eclipſe, which was obſerved at *London*, at 10^h 0′ *P. M.* was ſeen at *Uraniburge* at 10^h and 50′ *P. M.*

EXAMPLE 2. Suppoſe the middle of the ſame Eclipſe had been obſerved at *Uraniburge* at 10^h 50′, and I would then know at what hour and minute the ſame happened in the Meridian of *London*. Againſt *Uraniburge* (as before) I finde 50′ A, therefore, contrary to the Title, I ſubſtract 50′, and the Reſidue 10^d 0′ is the middle of the Eclipſe in the Meridian of *London*.

CHAP. II.

To Calculate the true place of the Sun.

FIrſt, by the Table entituled [A Table of the middle motion of the Sun] compute the middle motion of the Sun, and his Apogæon, by adding into one Sum the Numbers belonging to the Year, Moneth, and Day given.

2 Subſtract the Apogæan from the middle Longitude of the Sun, and the Reſidue will be the ſimple Anomalie.

3 With the ſimple Anomalie of the Sun, enter the Table of the Proſthaphæreſis or Æquation of the ⊙, finding the Signe in the Head of the Table, and the Degree in the firſt Column on the left hand, when the ⊙ Anomalie is leſſe then *6* Signes, but when greater then *6*, enter with the Signe in the bottome of the Table, and with the Degree in the firſt Column on the right hand, and in the common angle is the abſolute Æquation of the ⊙, to be added to, or ſubſtracted from, the middle motion of the ⊙, according to the Titles adde, or ſubſtract.

EXAMPLE. Let the time propoſed be the 10 of March 1652, at noon, at which time the ⊙ Place is to be enquired. Firſt, I enter the Table of the middle motion of the ⊙, finding the next leſſer ſumme to the Year propoſed, *viz.* 1601, and ſet down the middle motion agreeing thereunto. Secondly, becauſe there is yet wanting 51 Years, I take the next leſſer ſumme in the Table, entituled [A Table of the annuall motion of the ⊙, &c.] which I finde to be 40, and the middle motion of the ⊙ agreeing thereunto towards the right hand, I ſubſcribe under the former Summe, and becauſe there is yet remaining 11 Years, I again enter the ſaid Table, finding the number given, and excerpt the middle motions as before. Laſtly, I take in like manner, the middle motions belonging to the Moneth, Day, and Hour, and place them in Order, as before, which done, I adde the ſeverall Summes ſo diſpoſed into one; and the Aggregate is the middle motion required, as the following Synopſis maniſeſts.

		Longit. ⊙				Apog. ⊙			
Time given		S	D	′	″	S	D	′	″
Years	1601	9	19	58	34	3	5	43	28
	40	0	0	17	57			41	5
	11	11	29	20	35			11	18
March		1	29	8	19				10
D 10		0	9	51	23				3
Middle motion of ⊙		11	28	36	48	3	6	36	4

March 10. 1652 at noon.

Now that the ſimple Anomalie may be known, I ſubſtract the Apogæon of the ⊙ from his middle motion, and the Reſidue is the Anomalie deſired 8ˢ 22ᵈ 0′ 44″, with which I enter the Table of the Æquation of the Sun, (always taking the proportionall part if need require) and I finde the Æquation 2ᵈ 2′ 3″ under the title *Adde*, therefore I adde the ſaid Æquation, to the Suns middle motion, and the Aggregate 0ˢ 0ᵈ 38′ 51″ is the Suns true place that day at noon.

Another Example for Practiſe.

The 15 of *July* 1610, at 3ʰ 30′ *P. M.* the ⊙ place is required,

PRAXIS.

	Longitude ⊙				Aphel. of ⊙.				
Time given	*S*	*D*	′	″	*S*	*D*	′	″	
Years 1601	9	19	58	34	3	5	43	28	
Years 9	11	29	49	15			9	15	
July.	5	28	44	7				31	
D. 15		14	47	5				2	
Hou. 3			7	24					
Min. 30			1	14					
Middle Longitude of the Sun:	4	3	27	39	3	5	53	16	*Aphelion of the Sun.*
Aphel. of the Sun Subſtract.	3	5	53	16					
Reſts the Anomalie of the Sun:		27	34	23					
Æquation ſubſtract.			55	44					
True place of the Sun:	4	2	31	55					

And therefore the true place of the ⊙ from the Earth is 2ᵈ 31′ 55″ ♌, and the place of the Earth from the Sun in the oppoſite point, *viz.* in 2ᵈ 31′ 55″ ♒.

To finde the co-æquate Anomalie of the Sun, *and his Diſtance from the* Earth.

Firſt, that the co-æquate Anomalie of the Sun, and his Diſtance from the Earth may be had, enter the Table of the Æquation of the Sun, and in their proper Columns is our deſired Numbers. As in the laſt example, the ſimple Anomalie is 0ˢ 27ᵈ 34′ 23″, and therefore his Anomalie co-æquated 0ˢ 27ᵈ 5′ 33″, and his Diſtance from the Earth 101601.

But in the other Example, where the ſimple Anomalie is 8ˢ 22ᵈ 0′ 44″, I take the Complement of the Anomalie co-æquated, *viz.* 3ˢ 6ᵈ 58′ 34″, which being ſubducted from 12 Signes, leaveth 8ˢ 23ᵈ 1′ 26″, which is the co-æquate Anomalie deſired.

In like manner, is the co-æquate Anomalie, and Diſtance of the other Primarie Planets from the Sun, to be found by their Tables.

CHAP. III.

The true place of the Sun *being given, to reduce the Middle Time into the Apparent, and contrariwiſe.*

THe In-æquality of ˣnaturall Dayes ariſeth from the difference of the Right Aſcenſions of the Æquinoctiall, and Zodiaque, and from the Inæquality of the Daily Revolutions of the Earth about her Axis, as I have ſhewed in the preceding Booke, both which Æquations ariſing from the ſaid Arches, is digeſted into one Table, for more ſpeedy obteining thereof. Now that you may finde the Æquation of civill, or naturall dayes, enter the ſaid Table, finding the Signe of the ⊙ place on the Head, and the Degree on the left ſide, the common angle will ſhew the ſaid Æquation in minutes and ſeconds, which according to the titles A and S, muſt be added to, or ſubſtracted from, the equall time given, that it may be made apparent, But the contrary title is to be obſerved, when the apparent time is to be reduced to the equall.

ˣ vid 426
5-9

EXAMPLE. The equall time given is 1610, *July* $15^{d}\ 3^{ho}\ 30'$ *P. M.* the ☉ is then in $2^{d}\ 31'\ 55''$ ♌, which entred in the ſaid Table, giveth in the common angle $7'\ 21''$ to be ſubſtracted; this therefore being ſubſtracted from the middle time given, leaveth the apparent $3^{h}\ 22'\ 39''$.

CHAP. IV.

To calculate the true motion of the Moon *in Longitude for any time aſſigned.*

FIrſt, the place of the Sun is to be calculated to the time given, according to the Doctrine of the ſecond Chap.

2 The middle motion of the Moon, and her Aphelion, are to be ſought as is before ſhewed.

3 By ſubſtracting the motion of the Aphelion from the middle motion of the Moon, the Reſidue will be the ſimple Anomalie of her Orbite.

4 With the ſimple Anomalie of the Moon, enter the Table of the Abſolute Æquation of the firſt inæquality of the Moon, and you ſhall in like manner, as in the other Planets, obtein her abſolute Æquation (as in relation to her own Orbite) which is to be added to the middle motion of the Moon, and alſo to her ſimple Anomalie, or to be ſubſtracted from the ſame, according to the Titles.

5 The diſtance of the Moon from the Sun is found by ſuducting the true place of the Sun, from the place of the Moon thus æquated, with which Diſtance, and the Anomalie of the Moon æquated, enter the Table of her Reflection and Variation, finding the Diſtance of the ☾ from ☉ in the Front of the Table, from ☌ or ☍ to □, and the Anomalie æquated in the firſt Column deſcending on the left hand: but enter with the Diſtance of the ☾ from ☉ in the bottome of the Table from her □ to ☌ or ☍, and with her Anomalie æquated in the firſt Column aſcending on the right hand, (as the titles demonſtrate) and in the common angle is the true Æquation of her ſecond inæquality, either to be added to, or ſubſtracted from the feigned place of the Moon, before found, that it may be exact and abſolute.

EXAMPLE. At the time of *Tycho's* Obſervation 1587 Ho. $19\ 22'\ 36''$ *P. M*, the true place of the Moon is required: I therefore in the firſt place ſubſtract $50'$ for the difference of the Meridians of *London* and *Vraniburge*, and the Reſidue $18^{h}\ 32'\ 36''$ is the true time at *London*, at which time the ☉ is in $4^{d}\ 5'\ 47''$ ♍, which known, the calculation is to be fram'd as followeth.

Middle Motions of

	☾				*Aphel.* ☾.				*Node Aſc.* ☾.				
Time given.	S	D	′	″	S	D	′	″	S	D	′	″	
Years 1501	1	29	44	49	3	29	42	39	1	25	46	11	*Radix.*
80	5	24	14	56	0	15	26	16	3	17	20	54	
6	2	9	28	49	8	4	6	8	3	26	1	29	
Auguſt.	9	3	23	44	0	23	37	8	0	11	13	35	
Day 17.	7	13	59	55		1	53	38			54	1	
Hour. 18.		9	52	56			5	1			9	53	
Min. 32.			17	34				9				17	
Sec. 36.				20				0				00	
Middle motion of ☾.	3	1	3	3	1	14	50	59	7	25	40	9	Subſtra& frō Radix
Aphelion ☾ *ſubſtra.*	1	14	50	59					6	0	6	2	Node Aſc. ☾.
Anomalie of the ☾.	1	16	12	4									

The Anomalie of the Moon giveth the Proſthaphæreſis, or Æquation of the firſt Inæquality $3^{d}\ 27'\ 59''$ to be ſubſtracted, and therefore the place of the Moon firſt æquated is $27^{d}\ 35'\ 4''$ ♊, and her Anomalie æquated $1^{s}\ 12^{d}\ 44'\ 5''$.

The Diſtance of ☾ from the ☍ ☉, is $3^s\,23^d\,29'\,17''$.

With this Diſtance, and the Anomalie of the Moon æquated, I enter the Table of the Moons Æquation, entituled, (*A Table of Reflection and Variation, &c.*) and becauſe the Moon vadeth from □ towards ☌, I number the Anomalie æquated in the laſt Row, and the Diſtance of the ☾ from ☉ in the Foot or Bottom of the Table, and in the common angle (by making proportion for the intercepted Degrees) I finde the Æquation $1^d\,12'\,17''$ *S.* which, according to the Title, I ſubſtract from the place before æquated, and ſo her true place co-æquated is $26^d\,22'\,47''$ ♊, agreeing to the Obſervation of *Tycho*, and the account of Triangles, as is ſet forth in the former Book.

CHAP. V.

To compute the true Latitude of the Moon, *and to reduce her place from her Orbite to the Ecliptique*, & contra.

Having found the true motion of the Moon by the former Chapter, ſubduct from the ſame, the motion of her Node Aſcend. and the Remainder will be the æquated motion of the Moons Latitude. ☊

Then with the æquated Diſtance of the ☾ from ☉ enter the Table of the proportionall minutes of the Moons Latitude, and take out the proportionall minutes adhering thereunto.

Thirdly, with the æquated motion of the Moons Latitude, the Table of her Latitude is to be entered, and the Latitude to be taken, with the Exceſſe, whoſe proportionall Part muſt be extracted by the Minutes of Proportion.

EXAMPLE. By the former Chap. we found the true motion of the Moon to be $2^s\,26^d\,22'\,47''$, and the motion of her Node Aſcending $6^s\,0^d\,6'\,2''$, which I deduct from the Moons place, and the Remainder $8^s\,26^d\,16'\,45''$ is the æquated motion of the Moons Latitude.

The Diſtance of the ☾ from the ☉, is $3^s\,23^d\,29'\,17''$, and therefore the Proportionall minutes are $50'\,29''$.

With the æquated motion of the Moons Latitude, I enter the Table of Latitude, and there I finde her Latitude $4^d\,59'\,21''$, with Exceſſe $16'\,57''$, of which I take the proportionall Part by the Sexagenarie Table, after this Analogie.

As $60'$, to $16'\ 57''$: ſo is $50'\ 29''$, to $14'\ 15''$.

```
      50  29
    ---------
    13  20
        47  30
         7  44
            27  33
   ------------------
    14  15  41  33.
```

Which $14'\,15''$ being added to her Latitude $4^d\,59'\,21''$, giveth the true Latitude of the Moon $5^d\,13'\,36''$ South, agreeing to obſervation.

The Reduction of the Moon from her Orbite to the Ecliptique is thus to be ſought. With the æquated motion of the Moons Latitude, enter the Table of the Reduction of the Moon from her Orbite to the Ecliptique, and the Reduction there found, Adde, or Subſtract, to or from the true place of the Moon in her Orbite, according as the title directs; but the contrary title is to be applyed when her place is to be reduced from the Ecliptique to her Orbite.

EXAMPLE. The æquated motion of the Moons Latitude by the former work is found to be $8^s\,26^d\,16'\,45''$, with this I enter the Table, and I finde $55''$ to be ſubſtracted from the place of the Moon in her Orbite, and it leaveth the place of the Moon in the Ecliptique in $26^d\,21'\,52''$ ♊. And this was the true place of the ☾ at that inſtant, agreeing to the acurate Obſervation of *Tycho Brahe*.

Here is to be noted that both in this Paradigma, as alſo in that in the former Book, I have mentioned the middle time and the apparent, according to the Limitations of *Tycho Brahe*: and this I thought good to give the Reader notice of, leſt *Momus* ſhould haſtily cenſure, and be ready to ſay (before he underſtands) that the middle time here uſed is not exactly reduced from the apparent according to my own Rules and Tables. If he (or any other) demand the Reaſon hereof, I anſwer, is it not moſt conſentaneous to reaſon we follow him who made the Obſervation, & left us both the middle and the apparent time thereof by his will? much more then when the thing it ſelf is ambiguous and doubtfull.

CHAP. VI.

To calculate the true motions of the three ſuperior Planets, Saturn, Jupiter, *and* Mars.

FIrſt, to the time given, compute the true motion of the Sun, and his diſtance from the Earth, according to the Doctrine of the ſecond Chap.

2 Gather the middle motion of the Planet, his Aphelion, and Node Aſcending, as before we taught.

3 Subſtract the Aphelion from the middle Longitude, and the Reſidue will be the ſimple Anomalie of the Excentrique.

4 With the ſimple Anomalie, enter the Table of the Æquation of the Planet given, in like manner as we before ſhewed in the ☉ and ☾, and there take the Æquation, together with his diſtance from the Sun, which note apart by it ſelf, as in the Examples following, but the Proſtaphæreſis or Æquation there found, is to be added to, or ſubſtracted from, the middle motion of Longitude, according as the titles direct; ſo will the ſumme or Difference, be the Excentrique place of the Planet, or his place from the ☉ in his Orbite.

5 From the place of a Planet thus found, deduct his Node Aſcending, and the Reſidue will be the Argument of Latitude, or Anomalie of the Inclination of his Orbite, with which entring the Table of Inclination, Reduction, and Curtation, you ſhall obtein the Inclination of the Orbite, the Reduction, and Curtation: the latter whereof, namely the Curtation, is ever to be ſubſtracted from their Diſtance from the Sunne in their Orbites. And here note, that the Curtations ſet down in the Tables is calculated to the mean diſtance of the Planet from the Sun, which may ſerve exact enough for his Diſtance at any time, but concerning the Reduction, obſerve the following Rule.

If a Planet depart or move from either Node, towards the limits of his greateſt Latitude, the Reduction is to be ſubſtracted from the place found in the Orbite: but if he depart from the Limit, and approach towards the Node, the Reduction is to be added, for ſo the Sum or Difference will be his true place in the Ecliptique.

6 From the true place of the Sun from the Earth, ſubſtract the Longitude of the Planet from the Sun in the Ecliptique, and the Reſidue will be the Anomalie of Commutation, whoſe halfe Summe, if the Anomalie be leſſe then 180^{d}, is the half Summe of the angles unknown, that is to ſay, the half of the angle of Elongation, and angle of Parallax, but if the ſaid Anomalie be greater then 180^{d}, then take for the ſaid number the half of the Complement to 360^{d}.

7 Having by the Table of Æquation found the Diſtance of the Planet from the Sun, and the Diſtance of the Sun from the Earth, with the half Summe of the angles before expreſſed, we may by the Canon of Artificiall Sines and Tangents, ſpeedily obtein the angle of Elongation, and Parallax of the Earths Orbe, according to the Doctrine of the firſt *Book*, 2 *Chap.* 9 §: for as the Logarithme of the Summe of the ſaid Intervalls, is in proportion, to their Difference; ſo is the Tangent of half the Summe of the angles unknown, to the Tangent of an Arch, which being added to the half Summe of the angles unknown, giveth the angle of Elongation, but being ſubſtracted, leaveth the Parallax of the Earths Orbe.

Finally, In the former Semicircle, where the Anomalie of Commutation is leſſe then 180^{d}, the Parallax of the Orbe is always to be added to the place of a Planet from the Sun, but in the latter Semicircle, when the ſaid Anomalie is greater then 180^{d}, and leſſe then 360^d, the Parallax is to be ſubſtracted; for ſo will the Summe or Difference, ſhew the true place of a Planet from the Earth, as I ſhall more fully illuſtrate by the following Examples.

Example 1 *in* Saturn.

In the Year 1594 *December* 10. at $7^h\,50'$ *P, M.* noble *Tycho* obſerved ♄ in $24^d\,30'$ ♌ with Latitude $1^d\,18'$ North.

From the time given deducting $50'$ for the Difference of Meridians of *London* and *Uraniburge*, the time at *London* will be $7^h\,0'$, at which time, by my Tables, the middle motion of ♄ is $4^s\,14^d\,18'\,8''$ his Aphelion $8^s\,25^d\,51'\,53''$, and his Node Aſcending ♌, $3^s\,20^d\,28'\,51''$, which being given, I then, from his middle motion, ſubſtract his Aphelion, and the Remainder $7^s\,18^d\,26'\,15''$, is the middle Anomalie of the Excentrique with which Anomalie, J enter the Table of the Æquation of ♄, and J finde the Æquation correſponding thereto, to be $5^d\,9'\,2''$ with the Title *Adde*, alſo in the next Column towards the right hand, J take the Diſtance of ♄ from the ☉ to be 918744 (being ſuch parts whereof the Radius of the Earths Orbe is 100000) which (as in the following worke) is to be noted apart, but the Æquation, J adde (according to the Title) to the middle Longitude of ♄, and the Summe is the true place of ♄ from the ☉ in his Orbit $4^s\,19^d\,27'\,10''$.

Then J ſubſtract the Node Aſcend. of ♄, from the place of ♄ thus found, and the Reſidue is the Anomalie of Latitude $0^s\,28^d\,59'\,19''$, with which J enter the Table of Inclination, Reduction, and Curtation, where J finde his Inclination $1^d\,12'\,53''$ North, his Reduction $1'\,25''$, and the Curtation 216, then according to the former Rule (becauſe ♄ is going from his Node towards the Limit of his greateſt Latitude) J ſubſtract the Reduction from the place of ♄ in his Orbite, and the Remainder $4^s\,19^d\,25'\,45''$ is the true place of ♄ from the ☉ in the Ecliptique. Alſo from the Diſtance of ♄ from the ☉ before found 918744, J deduct the Curtation, and there reſts 918528, which is the Diſtance Curtated.

Having alſo by the ſecond *Chap.* found the place of the Sun to be $8^s\,28^d\,47'\,15''$, with his Diſtance from the Earth 98242, I ſubſtract the place of ♄ from the place of the ☉, and there reſts for the Anomalie of Commutation $4^s\,9^d\,21'\,30''$, which biſected, giveth the half Summe of the oppoſite angles $2^s\,4^d\,40'\,45''$ (or $64^d\,40'\,45''$) which known, to finde the Parallax of the Earths Orbe, &c. I take the Summe and Difference of the two laterall Diſtances, namely, of the diſtance of ♄ from the ☉ 918528, and of the Diſtance of the ☉ from the earth 98242, and J finde their Summe is 1016770, and their Difference 820286, from which (for facility of operation, and uſe of my Tables) J ſtrike off the two laſt Figures towards the right hand, and then by the Canon of Logarithmes, J ſay;

As the Summe 10167|70,		4,007193
To the Difference 8202|86;		3,913920
So the Tangent of half the Summe of the unknown angles	$64^d\,40'\,45''$;	10,325007
To the Tangent of	59 36 31:	10,231734
Angle of Elongation.	124 17 16	Aggregate.
Parallax of the Orbe.	5 4 14	Difference.

Finally, becauſe the Anomalie of Commutation is leſſe then the Semicircle 180^d, J therefore adde the Parallax of the Earths Orbe $5^d\,4'\,14''$, to the place of ♄ from the ☉, $4^s\,19^d\,25'\,45''$, and the true place of ♄ from the Earth will be $4^s\,24^d\,29'\,59''$, that is to ſay, in $24^d\,30'$ ♌, agreeing exactly to the Obſervation of noble *Tycho Brahe*.

The

The Operation in Saturn.

Time given.	Longit. ♄. s d ′ ″	Aphel. ♄. s d ′ ″	Node Aſ. ♄ s d ′ ″
Years 1501	2 04 56 57	8 23 46 10	3 19 32 15
80	8 18 46 40	0 01 47 04	48 12
13	5 09 02 34	17 24	7 50
December.	11 11 16	1 13	33
Day 10.	20 06	2	1
Hou. 7.	35	0	0
Middle Longitude of ♄	4 14 18 08	8 25 51 53	3 20 28 51
Aphelion ſubſtract.	8 25 51 53		
Anomalie of Excent.	7 18 26 15		
Æquation adde.	5 09 02		
Place of ♄ from ☉.	4 19 27 10		
Node Aſcend. ſubſt.	3 20 28 51		
Reſts.	28 58 19		
Reduction ſubſtract.	1 25		
Pla. ♄ from ☉ in Eclipt.	4 19 25 45		
Place of the Sun.	8 28 47 15		
Anomal. of Commut.	4 09 21 30		
Halfe Summe.	2 04 40 45		
Parallax of Orbe adde.	05 04 14		
True place of ♄ from the Earth.	4 24 29 59		
That is.	24 30 ♌		

Place of the Sun, 28^{d} 47′ 15″ ♐.

Diſtance of the Sun frō the Earth. 98242

The Argument of Latitude, which gives the inclination 1^{d} 12′ 53″ *North*, the Reduction 1′ 25″ *Subſtract.* and the Curtation 216.

918744 Diſtance ♄ from ☉ in his Orbe.
216 Curtation ſubſtract.

918528 Diſtance curtated.
98242 Diſtance of Earth from Sun.

Summe 10167|70 4,007193
Difference 8202|86. 3,913920
Tangent of 64^{d} 40′ 45″ 10,325007
Tangent of 59 36 31 10,231734

Aggr. 124 17 16 Elongation.
Differ. 5 4 14 Paralla. of the Orb. ad.

The Operation in Jupiter.

In the Year 1591, *January* the 9th. in the morning, *Michael Mæſtline* and *John Kepler*, beheld (at *Tubing*) ♃ eclipſed by ♂: For the colour of ♂ was read and fiery, which argued ♂ to be the inferiour.

Time given.	Longit. ♃. s d ′ ″	Aphel. ♃. s d ′ ″	Node Aſc. ♃ s d ′ ″
Years 1501	0 04 24 51	6 06 14 10	3 05 04 20
80	8 29 02 40	1 20 08	17 20
10	10 3 35 20	10 01	2 10
Day 10	39 54	3	0
Hour. 17	3 32	0	0
Middle Longitude of ♃	7 07 46 17	6 07 44 22	3 05 23 50
Aphelion ſubſtr.	6 07 44 22		
Anomalie of Excentr.	1 00 01 55		
Æquation ſubſtract.	02 38 27		
Place of ♃ from ☉.	7 05 07 50		
Node Aſcend. ſubſtr.	3 05 23 50		
Reſts	3 29 44 00		
Reduction adde.	25		
Plac. ♃ frō ☉ in Eclipt.	7 05 08 15		
Place of ☉	9 28 46 24		
Anom. of Commutat.	2 23 38 09		
Halfe Summe.	1 11 49 04		
Parallax of the Orb ad.	9 59 08		
True place ♃ frō Earth	7 15 07 23		
That is in	♏ 15 07 23		

Place of the Sun, 28^{d} 46′ 24″ ♑.

Diſtance of ☉ frō Earth. 98360

Diſtance of ♃ from ☉ in his Orbite 544446.

The Argument of Latitude, which gives the inclination 1^{d} 11′ 3″ *North*, the Reduction, 25″, and the Curtation 111 parts.

544446 Diſtance of ♃ from ☉ in his Orbite.
111 Curtation ſubſtract.

544335 Diſtance of ♃ Curtated.
98360 Diſtance of Earth from Sun.

Summe 6426|95 3,807941
Differen. 4459|75 3,649237
Tangent of 41^{d} 49′ 04″ 9,951658
Tangent of 31 49 56 9,792954

Aggr. 73 39 00 Elongation.
Diffe. 9 59 8 Paral. of the Orb.

The Operation in Mars.

Time given.	Longit. ♂.	Aphel. ♂.	Node Aſ. ♂
	s d ′ ″	s d ′ ″	s d ′ ″
Years 1501	8 05 05 15	4 26 58 30	1 15 30 49
80	6 13 19 52	1 37 12	58 8
10	3 23 54 16	12 9	07 16
Day 8	04 11 33	2	01
Hou. 17	22 16	0	00
Middle Longitude of ♂	6 16 53 12	4 28 47 53	1 16 36 14
Aphelion ſubſtract.	4 28 47 53		
Anomalie of Excent.	1 18 05 19		
Æquation ſubſt.	7 15 49		
Place of ♂ from ☉.	6 09 37 23		
Node Aſcend. ſubſt.	1 16 36 14		
Reſts.	4 23 01 09		
Reduction adde.	50		
Place ♂ frō ☉ in Eclipt.	6 09 38 13		
Place of the Sun	9 28 46 24		
Anomal. of Commut.	3 19 08 11		
Halfe Summe.	1 24 34 05		
Parallax of Orbe adde.	1 05 30 40		
True place of ♂ from the Earth.	7 15 08 53		
That is.	♏ 15^d 8′ 53″		

Place of the Sun 28^d 46′ 24″ ♑.

Distance of the Sun frō the Earth. 98360

Gives the Diſtance of ♂ from ☉ in his Orbite. 162500.

The Argument of Latitude, which ſheweth the Inclination 1^d 6′ 46″ *North*, the Reduction 50″ Adde, and the Curtation 29.

162500 Diſtance of ♂ from ☉ in his Orbite.
29 Curtation *Subſtract.*

162471 Diſtance of ♂ Curtated from the Sun.
98360 Diſtance of the Earth from the Sun.

Summe	2608	31	3,416207
Difference	641	11	2,806858
Tangent of 54^d 34′ 35″			10,147823
Tangent of 19 3 25			9,538374

Aggr. 73 37 30 Elongation.
Differ. 35 30 40 Parallax of the Orbe.

CHAP. VII.

To calculate the motion of the two inferiour Planets, Venus *and* Mercury.

THe Praxis of the Calculation is in a manner the ſame as before in ♄ ♃ and ♂, onely differeth from them in the collation of the Proſthaphæreſis of the Orbite, for in the ſuperiour Planets, the Parallax of the Orbite is the angle at the Planet; but in the inferiour, its the angle at the Earth, which in the former Semicircle being added, and in the latter Semicircle ſubſtracted, to, or from, the place of the Sun, giveth the true place of the Planet required.

In the Year 1590 *October* 3^d at 5^h in the morning, *Michael Mæſtlin* (at *Tubing*) obſerved ♂ eclipſed by ♀, for the colour of ♀ was bright, which ſhewed ♀ to be the the lower. *Mæſtlin pag.* 519. *Epit. Aſtron.* and *Kepler Aſtron. Opt. pag.* 205.

For the difference of the Meridians of *Tubing* and *London*, is 36′ to be ſubſtracted, therefore at *London*, the time is 16^h 24′, at which time the place of the ☉ from the Earth is 19^d 23′ 27″ ♎, and his diſtance from the Earth 99545. Alſo the place of ♂ is 15^d 31′ 40″ ♍, his latitude 1^d 16′ 7″ North, and his diſtance from the ☉ curtated 166503. The place of ♀ is then required.

A Type of the Operation in Venus.

	Longit. ♀.	Aphel. ♀.	Node Aſc. ♀	
Time given	s d ′ ″	s d ′ ″	s d ′ ″	
Years 1501	5 01 30 34	10 2 53 09	2 11 59 24	Place of the Sun, 19^{d} 23′ 27″ ♎.
80	0 15 29 13	1 12 01	48 00	
9	7 16 20 30	8 06	5 24	Diſtance of ⊙ frō Earth. 99545
October	2 17 23 37	41	27	
Day 02	3 12 16			
Hour. 16	1 04 05			
Min. 24	1 36			
Middle Longitude of ♀	3 25 01 51	10 4 13 57	2 12 53 15	
Aphelion ſubſtr.	10 4 13 57			
Anomalie of Excentr.	5 20 47 54			
Æquation ſubſtract.	7 41			
Place of ♀ from ⊙.	3 24 54 10			
Node Aſcend. ſubſtr.	2 12 53 15			
Reſts	1 12 00 55			
Reduction ſubſt.	2 58			
Plac. ♀ frō ⊙ in Eclipt.	3 24 51 12			
Place of ⊙ ſubſtract.	6 19 23 27			
Anom. of Commutat.	9 05 27 45			
Halfe Summe.	1 12 16 07			
Parallax of the Orb ſub.	1 03 52 50			
True place ♀ frō Earth.	5 15 30 37			
That is in	♍ 15 30 37			

Diſtance of ♀ from ⊙ in his Orbite 71812.

The Argument of Latitude, which gives the inclination of her Orbe, 2^{d} 15′ 44″ *North*, the Reduction 2′ 58″ ſub. and the Curtation 56.

71812 Diſtance of ♀ from ⊙ in her Orbite.
56 Curtation ſubſtract.

71756 Diſtance of ♀ from ⊙ Curtated.
99545 Diſtance of Earth from Sun.

Summe	17130|1	4,233757
Differen.	2778|9	3,443888
Tangent of	42^{d} 16′ 07″	9,958532
Tangent of	08 23 17	9,168663
Difference	33 52 50 Paral. of the Orb	

A Type of the Operation in Mercury.

Anno 1631, upon the 28th of *October* Old Stile, or the 7th of *November* New Stile, *Monſier Gaſſendus* (by helpe of a Teleſcope) obſerved a Conjunction of the ⊙ and ☿, for at 9 before noon he came upon the Sun, and at 10^{h} 28′ he was obſerved towards the South-Eaſt part of the ⊙ ſhadow (as it ſhewed it ſelfe to his view upon a white paper held behinde the Teleſcope) whereby it may be gathered, that in the Heavens he was placed towards the North-Weſt part of his body. Now how my Tables repreſent this famous Obſervation, I ſhall here examine.

For the difference of Meridians of *London* and *Paris*, is to be ſubſtracted 10′, the time therefore in the Meridian of *London* is 10^{h} 18′, at which time, according to my Tables, the true place of the ⊙ is 14^{d} 43′ 35″ ♏, and his diſtance from the Earth 98877.

The

The Operation in Mercury.

Time given.	Longit. ☿. s d ′ ″	Aphel. ☿. s d ′ ″	Node Aſ. ☿ s d ′ ″
Years 1601	2 02 49 48	8 12 48 15	1 12 30 00
20	0 14 53 00	34 48	30 00
10	6 05 23 44	17 24	15 00
October	1 07 13 17	1 18	1 08
Day 27	3 20 29 40	8	07
Hou. 22	3 45 04	0	
Min. 18	3 04	0	
Middle Longitude of ☿	1 24 37 37	8 13 41 53	1 13 16 15

Place of the Sun, 14ᵈ 43′ 35″ ♏.

Diſtance of the Sun frō the Earth. 98877

	s d ′ ″
Middle Longitude of ☿	1 24 37 37
Aphelion ſubſtract.	8 13 41 53
Anomalie of Excent.	5 10 55 44
Æquation ſubſt.	9 45 39
Place of ☿ from ⊙.	1 14 51 58
Node Aſcend. ſubſt.	1 13 16 15
Reſts.	0 01 35 43
Reduction ſubſtract.	41
Pla. ☿ from ⊙ in Eclipt.	1 14 51 17
Place of the Sun ſubſt.	7 14 43 35
Anomal. of Commut.	6 00 07 42
Complem. to 12 Signes	5 29 52 18
Halfe Summe.	2 29 56 09
Parallax of Orbe ſubſt.	3 32
True place of ☿ from the Earth.	7 14 40 03
That is.	♏ 14 40 3

Diſtance ☿ from ⊙ 31171.

The Anomalie of Latitude, which giveth the inclination 11′ 31″ *North*, the Reduction 41″ *Subſtract.* and the Curtation 0.

98877 Diſtance of Earth from Sun.
31171 Diſtance of ☿ from ⊙.

Summe	130048	4,114110
Difference	67706	3,830653
Tangent of 89ᵈ 56′ 09″		12,850849
Tangent of 89 52 37		12,667392
Differ.	3 32	Parallax of the Orbe.

CHAP. VIII.

To Calculate the Latitude of the five Planets, Saturn, Jupiter, Mars, Venus, Mercury.

AS in the Calculation of the Longitude of theſe five Planets, we have a twofold Longitude given, the one being the true place from the Sun, the other the apparent place from the Earth, which ſome call the true place, ſo is there a twofold Latitude, the one whereof is called Centricall, the other Terreneall. The Centricall ariſeth from the inclination of the Orbite of the Planet from the Eclipticк, but the other from the motion of the Earth, and is the apparent Latitude, as it is beheld from the Globe of the Earth. The Demonſtration whereof you may ſee in the former Book.

And ſeeing that the Latitude of any of theſe Planets may be obteined with much facility, by the Canon of Artificiall *Sines* and *Tangents*, I thought it altogether ſuperfluous to calculate any particular Tables to obtein it, ſith the labour would have been altogether as great, and therefore I ſhall here, in few words, but with much dexterity, give you a univerſall Rule how it is to be ſupputated.

The

The Analogie.

As the Sine of the Angle of Elongation, Is to the Sine of the angle of Commutation :

So is the Co-tangent of the Inclination . To the Co-tangent of the Latitude Required.

At the time above given , of *Tychos* obſervation 1594, *December* the 10 day, at 7 houres *P. M.* the Latitude of ♄ is required, at which time, the angle of Elongation is 124^{d} 17′ 16″, and the angle of Commutation 129^{d} 21′ 30″, and becauſe they are greater then the Quadrant, I deduct them ſeverally from the Semicircle 180^{d}, and there remains, for the angle of Elongation 55^{d} 42′ 44″, and for the angle of Commutation 50^{d} 38′ 30″: then having before, in the *Example* of ♄, found his Inclination to be 1^{d} 12′ 53″ *North*, the Latitude of ♄ may (according to the former Analogie) be readily, and alſo exactly found.

The Operation in Saturn.

Analogie	Sine of the complement of Elongation	55^{d}	42′	44″,	9,917095
	Sine of the complement of Commutation	50	38	30	9,888289
	Co-tangent of the Inclination of ♄	1	12	53	11,673582
	Co-tangent of the Latitude of ♄ *North*	1	17	53	11,644776

Therefore, the Latitude of ♄ was 1^{d} 18′, agreeing to Obſervatiou.

In Jupiter.

In the *Example* before ſet down, the angle of Elongation is 73^{d} 39′, and the angle of Commutation 83^{d} 38′ 9″, the Inclination of his Orbe being 1^{d} 11′ 3″ *North*, hence his Latitude from the Earth will be 1^{d} 8′ 36″ *North*.

Analogie	Sine of Elongation	73^{d}	39′	00′	9,982072
	Sine of Commutation	83	38	09	9,997315
	Co-tangent of inclinatiō	1	11	03	11,644648
	Co-tangent of Latitude	1	08	36	11,699891

In Mars.

In the *Example* of ♂, his Inclination is found to be 1^{d} 6′ 46″ *North*, the angle of Elongation 73^{d} 37′ 30″, and the Anomalie of Commutation 109^{d} 8′ 11″, whoſe complement is, 70^{d} 51′ 49″, which given, the Latitude may be acquired, as before.

Analogie	Sine of Elongation	73^{d}	37′	30′	9,982016
	Sine of Commutation	70	51	49	9,975313
	Co-tangent of Inclinatiō	1	6	46	11,711660
	Co-tangent of the Lat.	1	7	48	11,704957

At the time of the above mentioned Obſervation of *Mæſtlin* and *Kepler.*, the place of ♃ was 15^{d} 7′ 23″ ♏, and the place of ♂ 15^{d} 8′ 53″ ♏, therefore the difference of Longitude was only 1′ 30″, and here the difference of Latitude is but 48″, therefore the Diameter of ♂ being neere 3′ he Eclipſed ♃ according as *Mæſtlin* and *Kepler* obſerved.

And here I can but ſmile at the folly of *Lanſberge*, who, to fit his own purpoſe, would have this ☌ ♃ ♂ to be on the 8 day in the morning, and for no other end (as I conceive) but becauſe he could not make the Obſervation to agree with his Tables, but in oppoſition of his error, and his own words *fal.* 171 *De Obſervat. Aſtron. theſauro*, I ſay the true Aſtronomicall account affirmeth, it was the 9th. day in the morning; ſo alſo teſtifieth the two famous Obſervers thereof, *Kepler in Aſtron. Opt. pag.* 303, and *Mæſtlin Epit. Aſtron. pag.* 519.

In Venus.

By the Synopſis of the calculation of ♀ aforegoing, the Inclination of her Orbite is 2^{d} 15′ 44″ *North*. the angle of Elongation 33^{d} 52′ 39″, and the complement of the angle of Commutation to the Circle 84^{d} 32′ 15″. Then to finde her Latitude from the Earth, I ſay,

Analogie	As the Sine of the angle of Elongation	33^{d} 52′ 39″	9,746184
	To the Sine of the angle of Commutation	84 32 15	9,998023
	So the Co-tangent of the Inclination	2 15 44	11,403363
	To the Co-tangent of Latitude	1 16 2	11,655202

At the time of this Eclipticall Conjunction of ♂ and ♀, 1590, *October* 3, at 5 *A.M.* the true place of ♂ by my Tables is 15^{d} 31′ 40″ ♍, and the place of ♀ 15^{d} 30′ 37″ ♍, alſo the Latitude of ♂ is 1^{d} 16′ 7″ *North*, and the Latitude of ♀ 1^{d} 16′ 2″ *North*, the difference of Latitude is 5″, and the difference of Longitude 1′ 3″, which equallizeth the Parallax of Longitude, which is about 1′ *ad Ortum*, therefore the apparent Diameter of ♀ being 2′, ſhee covered ♂ juſt as *Mæſtlin* obſerved at *Tubing*.

In Mercury.

In the former operation of ☿, the angle of Elongation is 3′ 32″, the angle of Commutation 7′ 42″, and the inclination of his Orbite 11′ 31″ *North*: Hence to finde his Latitude, the Analogie is.

Analogie	Sine of the Angle of Elongation	3′ 32″	7,011834
	Sine of the Angle of Commutation	7 42	7,350200
	Co-tangent of the Inclination	11 31	12,474949
	Co-tangent of the Latitude	5 17	12,813315

In this remarkable ☌ of ☉ and ☿ 1631 *October* 28, at 10^{h} 28′ in the Meridian of *Paris*, the place of the Sun was 14^{d} 43′ 35″ ♏, and the place of ☿ 14^{d} 40′ 3″ ♏, with Latitude 5′ 17″ *North*, therefore ☿ was diſtant from the centre of the Sun towards the *North-Weſt* part 6′ 21″, agreeing exactly to the Obſervation of *Monſier Gaſſende*.

CHAP. IX.

To finde the Places of the Fixed Stars *at any time given.*

IN regard the motions of the Fixed Stars are, by Obſervations in all ages, deprehended to be equall, therefore to finde their places, it is no more but to get the middle motion of *The firſt Star of Aries* to the time given, to which if there be added the diſtance of the Star whoſe Longitude is ſought, the Aggregate wil be the place of the Star required.

EXAMPLE, I deſire to know the place of *The Lyons Heart*, the 1 of *January* 1651, therefore I firſt gather the motion of *The firſt Star of Aries* thus.

	s	d	′	″	
1601	0	27	36	59	
40			33	58	
10			8	29	
1651	0	28	19	26	The place of *The firſt Star of Aries*

Then in the Catalogue of the Fixed Stars, I finde *The Lions Heart* is diſtant from *The firſt of Aries* 3^{s} 26^{d} 40′ (which I finde by ſubſtracting the place of *The firſt of Aries* from the place of *The Lions Heart*) which being added to the place of *The firſt of Aries*, giveth the place of *The Lions Heart*, *Jan.* 1 1651. In 24^{d} 59′ 26″ ♌.

	s	d	′	″
Place of *The firſt Star of Aries, Jan.* 1 1651	0	28	19	26
Diſtance of *The Lions Heart*, Adde	3	26	40	09
Place of *The Lions Heart, Janu.* 1 1651	4	24	59	26

The like order may be obſerved in any other of the Fixed Stars placed in the Catalogue.

CHAP. X.

To finde the refraction of any Starre, and to correct the Altitude obſerved.

With the Altitude of the Sun, Moon, or Star given, enter the Table of *Refractions*, and the Refraction there found, take from the Altitude obſerved, and the true Altitude will emerge, or adding the ſaid refraction to the true Altitude, the apparent will emerge. For the Refraction elevates, and makes the Sun, Moon, and Stars, appear higher above the Horizon then they are. But the contrary hapneth in the Parallax, which alwayes depreſſeth a Star, and makes it appear lower then it is, and therefore the Parallax ought alwayes to be added to the Altitude obſerved, that the true Altitude may be had.

CHAP. XI.

To finde the middle time of the Conjunction or Oppoſition of the Luminaries

This Precept being of great uſe, eſpecially in the calculation of Eclipſes of the Sun and Moon, it is therefore requiſite (for your better underſtanding) that we here make ample Demonſtration: Wherefore,

To the Meridian of the laſt day preceding the Moneth given, compute the mean Longitude of the Sun and Moon, and if their places concur and agree exactly, the middle time of the New Moon falleth in the Meridian of the laſt day; or, if the place of the Moon exceed the place of the Sun exactly ſix Signes, then the middle time of the Full Moon happeneth at the ſame inſtant; but if their places otherwiſe diſagree (as moſt commonly it happeneth) then ſubſtract the place of the Moon, from the place of the Sun, and the reſidue is the diſtance of the Moon from the Sun, or from the Oppoſition of the Sun, by allowing 6 Signes, which reduce into Sexagen's, by allowing two Signes to one Sexag. and then convert the ſaid diſtance (by the *Sexagenarie* Table of the Longitude of the Moon from the Sun) into Dayes, and Minutes of the Day; which being reduced into time, giveth the middle of the New Moon in the year and moneth propoſed.

EXAMPLE, It is required to know the time of the New and Full Moon in *March* 1653, therefore, according to the Precept, the middle time is thus obteined.

	☉				☾				
Time given.	s	d	′	″	s	d	′	″	
Years 1601	09	19	58	34	0	07	33	29	
Years 40	00	00	17	57	8	27	07	28	
Years 12	00	00	05	23	5	02	08	14	
March.	01	28	09	11	1	27	04	26	
Middle motion of ☉.	1	118	31	05	4	04	13	37	Middle motion of the ☾.
Middle motion of ☾ ſubſt.	04	04	13	37					
Reſts Diſtance of ☾ from ☉.	07	14	17	28					
Semicircle ſubſt.	06	00	00	00					
Diſtance of ☾ from ☍ ☉.	01	14	17	28					

Which by the *Sexagenary* Table of the Longitude of the ☾ from the ☉, is thus to be reduced into Daies, and Minutes of the Day.

		d	′	″
				06
			12	05
		7	43	08
Diſtance of ☾ from ☍ of ☉		44	17	28
	3^d	36	34	20
	37′	7	31	03
	59″		11	59
	30‴			6

Or thus, which is all one.

	d	′	″
Diſt. ☾ frõ ☍ ☉	44	17	28
Dayes 3	36	34	20
Reſts	7	43	08
37′	7	31	03
Reſts		12	05
59″		11	59
Reſts			6
30‴			6

Which is reduced into Time thus.

	h	′	″	‴
37′	14	48		
59″		23	36	
30‴			12	00

Totall, Dayes 3 Hou. 15, 11′ 48″ 0‴.

Therefore the middle time of the full ☾ happeneth in *March* 1653, the 3 day, 15 houres, 11 minutes, and 48 ſeconds.

Now to finde the time of the mean ☌ ☉ ☾ next following, I adde to the Full Moon given the halfe *Syzygia* 14^d 18^h 22′ 2″, and the product will give the time of the middle of the Nevv Moon next following, *viz.* *March* 18^d 9^h 33′ 50″.

Finally, if you would know the times of the New and Full Moons in the following Moneths, adde to the time of the New or Full Moon given ſtill 14^d 18^h 22′ 2″, and you ſhall have the equall time of the *Syzygia* next following, and thus may you proceed frow New Moon to Full Moon, and from Full Moon to New Moon at pleaſure.

CHAP. XII.

To finde the time of the true Conjunction or Oppoſition of the Sun *or* Moon.

TO the time of the middle ☌ or ☍ ☉ ☾, calculate their true places, and if their motions ſhall agree, and be both one, the mean and true ☌ falleth together at that very moment; but if their places differ, as moſt commonly it happeneth, then take their difference, which divide by the true hourely motion of the ☾ from the ☉, the Quotient will give the intervall or diſtance betvveen the mean *Syzygia* and the true (vvhich never exceedeth 14^h) and this adde to the time of the mean *Syzygia*, if the place of the ☾ be leſſe then the place of the ☉, or deduct the ſame from the time of the mean *Syzygia*, if the place of the ☾ be greater then the place of the ☉, and you ſhall have the time of the true *Syzygia* vvell nigh; to vvhich time compute the true motions of the ☉ and ☾, and if their places agree exactly, you have the accurate moment of the true *Syzygia*, but if there be ſome ſmall difference (as often times happeneth) then divide the ſame by the true hourely motion of the ☾ from the ☉ at that moment, and the Quotient adde to, or ſubſtract from, the time before found (according as the place of the ☾ is leſſer or gceater then the place of the ☉) and you ſhall have the time of the true *Syzygia*.

EXAMPLE, By the aforegoing precept, the middle time of the ☍ ☉ ☾ in *March* 1653, is the third day, 15^h 11′ 48″, at which time the true places of the ☉ and ☾ are thus enquired.

Middle

☉	s d ′ ″	☾	s d ′ ″
Middle motion of ☉	11 22 05 57	Middle motion of ☾	05 22 05 57
Apog. ☉ ſubſtract.	03 06 37 03	Apog. ☾ ſubſtract.	06 12 01 14
Anomalie of ☉	08 15 28 54	Anomalie of ☾	11 10 04 43
Æquation of ☉ adde	01 59 37	Æquation of ☾ Excen.ad.	1 37 31
True motion of the ☉	11 24 05 34	Motion of ☾ æquated.	05 23 43 28
Place of the ☾	05 23 43 50	Anomalie of ☾ æquated.	11 11 42 14
Diſt. of ☾ from ☍ of ☉	21 44	Reflection & variatiõ ad.	22
		Place of ☾ coæquate	05 23 43 50

With the co-æquate Anomalies of the ☉ and ☾, I enter the Tables of their hourly motions, and I finde, the hourly motion of the ☉ to be 2′ 29″, and the hourly motion of the ☾ 29′ 50″, then deducting the ☉ hourly motion out of the Moons, the Remainder 27′ 21″ is the hourly motion of the ☾ from ☉, by vvhich dividing their Diſtance 21′ 44″, it giveth in the Quotient 47′ 41″, vvhich added to the time of the middle ☍ ☉ ☾, maketh 3^{d} 15 59′ 29″ at vvhich time the ☉ is in 24^{d} 7′ 32″ ♓, and the ☾ in 24′ 7′ 36″ ♍, therefore becauſe the place of the ☾ exceeds the place of the ☉ 4″, I ſubſtract 8″ (which is found by dividing the 4″ by the hourly motion) from the time given, and the corrected time of the true Oppoſition will be 3^{d} 15 59′ 21″, at which time, I again examine the places of the ☉ and ☾, as you may ſee in the following Paradigmata's.

☉	s d ′ ″	☾	s d ′ ″
Middle motion of ☉	11 22 07 54	Middle motion of ☾	05 22 32 04
Apog. ☉ ſubſtract.	03 06 37 03	Apog. ☾ ſubſtract.	06 12 01 27
Anomalie ☉.	08 15 30 51	Anomalie of ☾	11 10 30 37
Æquation of ☉ adde.	00 01 59 38	Æquation of ☾ adde.	00 01 35 28
Anomalie of ☉ co-æquate.	08 16 30 01	Anom. of ☾ coæquate.	11 11 21 34
True place of the ☉.	♓ 24 07 32	True place of the ☾.	♍ 24 07 32

True motion of ☾	5 24 7 32
Node Aſcend. ſubſtract.	11 22 29 22
Anomalie of the latitude ☾	6 1 38 10.

By the former Synopſis, I finde the ☉ and ☾ are exactly in oppoſite places, ſhewing the true Oppoſition is exactly atteined, then if we ſubſtract 5′ 57″, for the Æquation of Civill Days, it leaveth the apparent time 15^{h} 53′ 24″.

CHAP. XIII.

To finde the apparent Semidiameters of the Sun, Moon, *and* Shadow *of the Earth, in the* Syzygia's, *or New and Full* Moon.

ENter the Table of the Semidiameters of the ☉ ☾, and ſhadow, &c. and with the Anomalie of the ☉, take his Semidiameter, his Horizontall Parallax, and his hourly motion; Likewiſe, with the Æquated Anomalie of the ☾, you may take her Horizontall Parallax, and Semidiameter, then from the Aggregate of Horizontall Parallax of the ☉ and ☾, take the ☉ Semidiameter, and the Reſidue will be the apparent Semidiameter of the Earths ſhadow.

As in the former Eclipſe, the Anomalie of the ☉ is 8^{s} 16^{d} 30′ 1″, and therefore his hourly motion is 2′ 29″, Horizontall Parallax 2′ 21″, and his Semidiameter 16′ 32″.

Again, with the Æquated Anomalie of the ☾ $11^s\ 11^d\ 21'\ 34''$, I take her Horizontall Parallax $55'\ 51''$, and her Semidiameter $15'\ 38''$.

	′	″
Horizontall Parallax of ☉	2	21
Horizontall Parallax of ☾	55	51
Aggregate	58	12
Semidiameter of ☉ ſubſtract	16	32
Reſts Semidiameter of the Earths ſhadow	41	40.

CHAP. XIV.

To finde when the Moon *will be Eclipſed, and when not.*

RULE I.

AT the time of the mean Full Moon, if her middle place ſhall be diſtant from either of her Nodes leſſe then $15^d\ 12'$ either according, or contrary to the ſucceſſion of the Signs, that Full Moon will be eclipſed,

EXAMPLE. At the time of the middle of the Full Moon before mentioned, to be in *March* 1653, the $3^d\ 15^h\ 11'\ 48''$, the middle place of the ☾ is $5^s\ 22^d\ 5'\ 57''$, and the place of the Dragons tail $5^s\ 22^d\ 29'\ 28''$, ſo that between the place of the Moon, and her South Node is but $23'\ 31''$, whereby I conclude the ſaid Full Moon will be eclipſed.

RULE II.

If at the time of the true Full Moon, her Latitude be leſſe then the Summe of the Semidiameter of the Moon, and the Earths ſhadow, the Moon will ſuffer Eclipſe, but if greater, ſhe cannot be eclipſed at that full.

EXAMPLE. In the ſaid Eclipſe, her Latitude at the time of the true Full Moon, is $8'\ 33''$ South, and the Aggregate of the two Semidiameters is $57'\ 18''$, therefore, becauſe the Moons latitude is leſſe then the ſaid Aggregate, I pronounce that the ſaid Full Moon will be Eclipſed.

And here note, that the difference of the Moons Latitude, and the ſaid Semidiameters $48'\ 45''$ is called the Parts Deficient.

CHAP. XV.

Of the Reduction of time, from the true ☌ or ☍ ☉ ☾, to the apparent time thereof.

BEcauſe the time of the apparent ☌ or ☍ ☉ ☾, before found, doth ſometimes a little differ from the true time, as I have before declared, I ſhall therefore here ſet down how to obtein the ſame.

Having found the Reduction of the Moon, as is taught in the 5 Chapter, divide the ſame by the trne hourly motion of the Moon from the ☉, and the Quotient ſhews the difference deſired.

As in our Example aforegoing, where the Anomalie of her Latitude is $6^s\ 1^d\ 38'\ 10''$, which gives the Reduction of her Orbite to the Ecliptique $24''$ ſubſtract, and this being divided by the hourly motion of the ☾ from ☉, exhibiteth in time $53''$ to be added to the apparent time $15^h\ 53'\ 24''$, ſo that the exact time of the apparent Oppoſition of the ☉ and ☾ is *March* $3^d\ 15^h\ 54'\ 17''$.

CHAP. XVI.

To finde the diſtance of the true Conjunction or Oppoſition of the Sun *or* Moon *from the greateſt Obſcuration.*

WIth the Latitude of the Moon, enter the Table of the diſtance of the true Conjunction and Oppoſition from the greateſt Obſcuration, and you ſhall have the diſtance required, which divide by the hourly motion, &c.

EXAMPLE. The Latitude of the Moon in the former Eclipſe is 8′ 33″ South Deſcending, and therefore the diſtance of the true Oppoſition from the greateſt Obſcuration is 45″, which divided by the hourly motion, giveth 1′ 38″ to be ſubſtracted, ſo that the greateſt Obſcuration happeneth at 15ʰ 52′ 39″.

CHAP. XVII.

To finde how many Digits the Moon *will be eclipſed.*

HAving found the true Latitude of the Moon, her Semidiameter, and the Semidiameter of the Earths ſhadow (as before is taught) you are then to deduct the Moons Latitude out of the Aggregate of the ſaid Semidiameters, and the Remainder ſhall be the Part deficient, which found, you are to reaſon thus. As the Semidiameter of the Moon, is in proportion to twelve Digits, ſo is the Part Deficient, to the Digits eclipſed. As in the Eclipſe of the Moon to be 1653 *March* 3ᵈ 15ʰ 52′ 39″, the Semidiameter of the Moon is 15′ 38″, and the Part Deficient 48′ 45″, therefore I ſay,

As 31′ 16″ is to 12 Digits, So is 48′ 45″, to 18ᵈ 42′ 36″.

By the Sexagenarie Table, the Work is thus.

′ ″ ‴
48 45
12
9 36
9 — [Dig. 18 42′ 36″.]
Aggregate 9 45 0
Diameter ☾ 31 16
9 18
4 48
9 22 48
Reſts 22 12
Diameter of ☾ 31 16
21 42
11 12
21 53 12
Reſts 18 48.

Or by the Canon of Logarithms, thus.

As the Diameter of ☾ 31′ 16″ (or 1876″,)	3,273233
Is to 12 Digits (or 720′;)	2,857332
So is 48′ 45″, (or 1925″,)	3,466126
To 18ᵈ 42′ 36″ (or $1122\frac{36}{60}$:) as before.	3,050225

CHAP. XVIII.

To finde the Minutes and time of Incidence, and the half continuance of the Moon *in the Earths ſhadow, called in Latine* Mora dimidia.

IN the 29 Chap. of the former Book, I ſhewed how to reſolve this Propoſition Trigonometrically, which way, becauſe it affords much brevity, we ſhall here follow.

In the Example laid down, the Summe of the Semidiameters of the Moon and ſhadow, being reduced into Seconds, is 3438″, and the Latitude of the Moon 513.

Operation.

Summe of the Semidiameters of Moon and ſhadow 3438″.
Latitude of the Moon 513

Aggregate 3951 ———— 3,596707.
Difference 2925 ———— 2,466126.

Summe 7,062833
Minutes of Incidence 56′ 40″, or 3400″. half Summe 3,531416

Which are the minutes of Incidence, and half continuance together.

To finde the minutes of the half continuance.

Difference of the Semidiameter of ☾ and ſhadow 1562
Latitude of the Moon 513

Summe 2075 ———— 3,317018.
Difference 1049 ———— 3,020775.

Aggregate 6,337793.
Minutes of the half continuance 24′ 35″ or 1475″. Semi-aggr. 3,168896.

Then as before is taught, I divide the minutes of Incidence and half continuance together 56′ 40″, by the true hourly motion of the Moon from the Sun, 27′ 21″, and the Quotient giveth the time of Incidence & half tarrience together, 2h 4′ 19″, then I divide the minutes of the half tarrience, by the hourly motion, and the *Quotus* 53′ 56″ ſheweth the time of her half continuance in the ſhadow.

	ho	′	″
Time of the greateſt Obſcuration	15	52	39
Half Duration.	2	4	19
Beginning of the Eclipſe.	13	48	20
End.	17	56	58
Half tarrience in the ſhadow.	0	53	56
Beginning of totall darkneſſe.	14	58	43
End of totall darkneſſe.	16	46	35

CHAP. XIX.

To finde the Latitude of the Moon, *at the beginning and end of the* Eclipſe.

THat the Eclipſe of the Moon may fitly be deſcribed *in Plano*, its here expedient, I ſhew how to finde her Latitude both at the beginning and ending of the Eclipſe: therefore,

Take the minutes of Incidence and half tarrience together, and adde thereto the middle motion of the Sun agreeing to the time of Incidence and half tarrience, the Summe whereof take from the true motion of the Moons Latitude, at the time of the middle of the Eclipſe, and you ſhall have the true motion of her Latitude at the time of the beginning of the Eclipſe; but adding the ſame to the true motion of her Latitude at the time of the middle of the Eclipſe, you ſhall have the true motion thereof, at the end of the Eclipſe, by help whereof you may by the 5 Chapter finde her true latitude.

EXAMPLE. In the Eclipſe, before mentioned, the middle motion of the Sun agreeing to the time of Incidence and half tarrience together is 5′ 7″, which being added to the minutes of Incidence and half tarrience 56′ 40″, maketh $1^{d}\ 1'\ 47''$, this I ſubſtract from the true motion of her Latitude at the middle leaveth the motion of her Latitude at the beginning, $6^{s}\ 0^{d}\ 36'\ 23''$, but being added, it giveth the motion of her Latitude at the end, $6^{s}\ 2^{d}\ 39'\ 57''$. Hence her Latitude at the beginning is 3′ 10″ South Deſc. and at the end 13′ 56″.

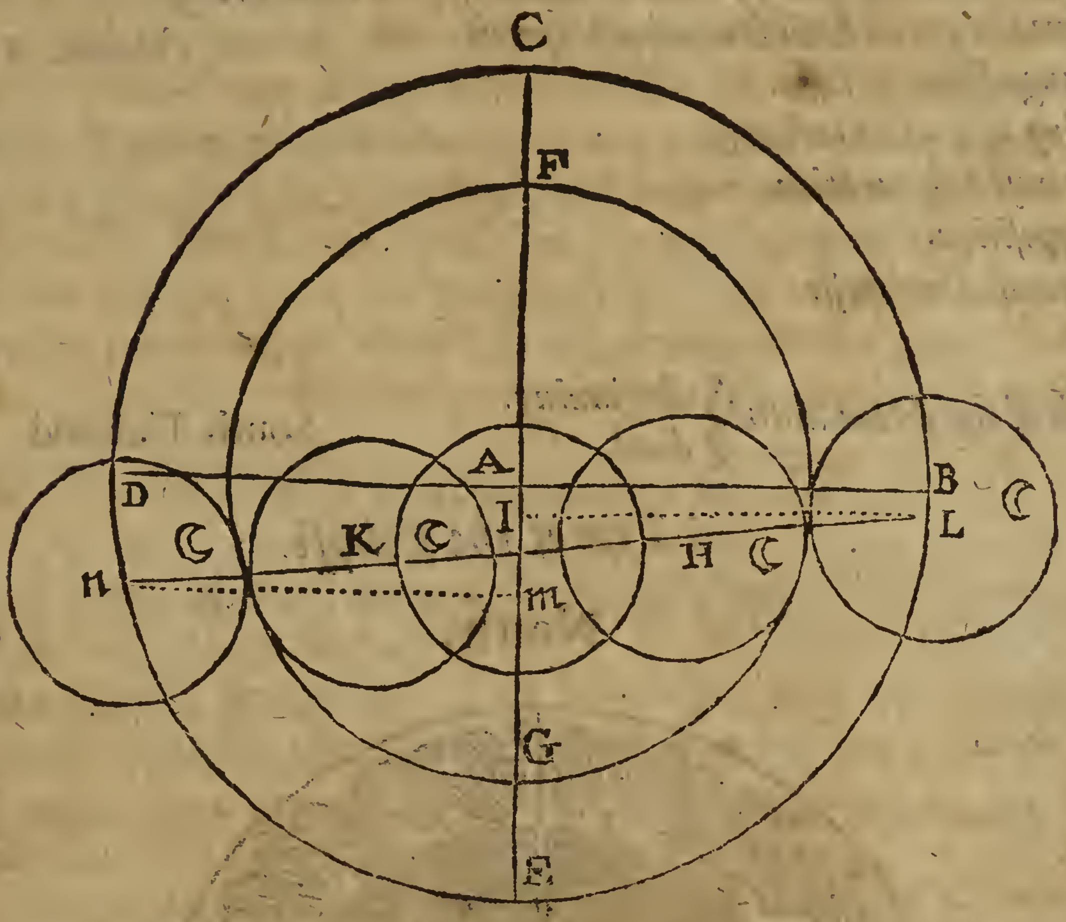
CHAP. XX.

To delineate and Typifie the Eclipſe of the Moon in Plano.

TO deſcribe the Eclipſe of the Moon *in plano*, there muſt be given, (1) the Semidiameter of the Moon, (2) the Semidiameter of the ſhadow, (3) the Latitude of the Moon, both to the beginning and ending of the Eclipſe, which had, deſcribe two Orthogonall lines cutting each other in the point A (as you may behold in the following Figure) to be of ſufficient length for the number of the Parts of the Aggregate of both the Semidiameters, as D B, E C, and let B repreſent the Weſt, D the Eaſt, C the North, E the South. Then on the Center A, deſcribe a Circle, conteining the Summe of both the Semidiameters, whoſe Circumference is noted with the lettets B C D E, and on the ſame Center A, deſcribe a leſſer Circle within the former, comprehending onely the Semidiameter of the ſhadow, whoſe Circumference is F G. Finally, upon the line C E, note the latitude of the Moon both at the beginning and ending of the Eclipſe, numbring it Northward or South-ward from the Ecliptique line B D, according to the denominrtion and ſpecies thereof, drawing parallel lines to the Eaſt and Weſt, and at the end of each line make a mark, and from theſe marks draw a ſtreight line, which ſhall repreſent the way of the Moon, during the time of the Eclipſe, upon which line, deſcribe five Moons (if the Eclipſe be totall) the firſt in C, the ſecond in H, the third in I, the fourth in K, the fift in N, the firſt towards the Weſt, ſhewing the beginning of the Eclipſe, the ſecond the beginning of total darkneſſe, the third the middle of the Eclipſe, the fourth the end of totall darkneſſe, the fifth and laſt the finall end of the Eclipſe.

EXAMPLE: In the Eclipſe before treated of, the Semidiameter of the ☾ is 15′ 38″, tbe Semidiameter of the ſhadow 41′ 40″, the Latitude of the Moon at the beginning 3′ 10″ South, and at the end 13′ 56″, which given, on the Center A, (the Interſection of the two Orthogonall lines) I deſcribe a Circle, conteining the quantity of both the Semidiameters of the Moon and the ſhadow, 57′ 18″, as B C D B, and on the ſame Center A, I deſcribe another leſſer Circle, as F G F, conteining onely the Semidiameter of the ſhadow 41′ 40″. Again, in the line E C, from the point A, towards E, I note the Latitude of the Moon at the beginning of the Eclipſe 3′ 10″, South, drawing the line I L parallel to A B. Alſo in the ſame line I account the Latitude of the Moon in the end of the Eclipſe 13′ 56″ South, extending M N parallel to A D, which done, I draw forth a ſtreight line from L to N, which ſhall repreſent the way of the Moon during the ſaid Eclipſe, and laſtly, L ſheweth the place of the Moon at the beginning of the Eclipſe, H her place when ſhe begins to be totally darkned, I her place at the middle, K her place when ſhe begins to recover light, and N the end of the Eclipſe, or the place when ſhe recovers her perfect light.

The Figure.



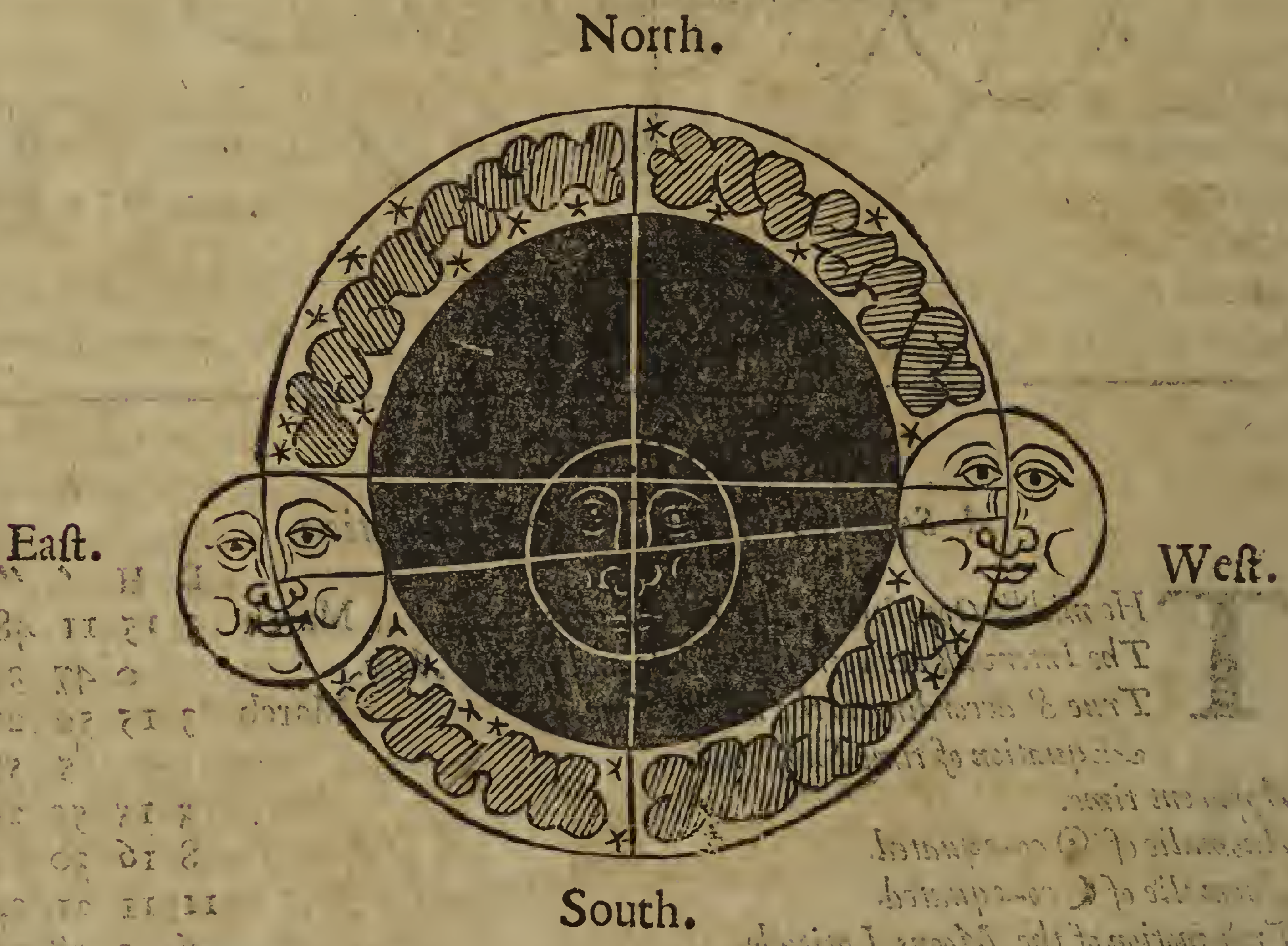
CHAP. XXI.

A Synopſis of the whole Calculation.

		D	H	′	″
The middle Oppoſition of the Luminaries.	March	3	15	11	48
The Intervall between the middle and true ☍ Adde.			0	47	33
True ☍ according to the middle time.	March	3	15	59	21
Æquation of time Subſtract.				5	57
Apparent time.		3	15	53	24
Anomalie of ☉ co-æquated.		8	16	30	1
Anomalie of ☾ co-æquated.		11	11	21	34
True motion of the Moons Latitude.		6	1	38	10
True Latitude of the Moon.	South Deſc.			8	33
The true place of the Sun.		♓	24	7	32
The true place of the Moon in her Orbite.		♍	24	7	32
Reduction Subſtract.					24
Place of the Moon in the Ecliptique.		♍	24	7	8
Hourly motion. { *Sun.*				2	29
Hourly motion. { *Moon.*				29	50
Hourly motion. { *Moon from Sun.*				27	21
By which I divide the Reduction or Diſtance of ☉ and ☾.					24
And the Quotient in time is.					53
Therefore the exact time of the apparent ☍ ☉☾ is	March.	3	15	54	17
Semidiameter of Moon.				15	38
Semidiameter of Shadow.				41	40
Aggregate of the two Semidiameters.				57	18
Parts Deficient.				48	45
Digits Eclipſed.	Dig.		18	42	36
Minutes of Incidence and half tarrience together.				56	40
Minutes of half tarrience.				24	35
Time of Incidence and half tarrience together.			2	4	19
Time of half tarrience.				53	56
Totall Duration.			4	8	38

		D	H	′	″
Latit. ☾, *giveth the Diſtance of the true* ☍ *from the greateſt Obſcuration.*					45
Which divided by the hourly motion giveth the ſpace of the true ☍ *from the greateſt Obſcuration.* Subſtract.				1	38
Therefore the greateſt Obſcuration hapneth.	March	3	15	52	39
Beginning of the Eclipſe.			13	48	20
Beginning of totall Darkneſſe.			14	58	43
The greateſt Obſcuration.			15	52	39
True Oppoſition.			15	54	17
End of totall Darkneſſe.			16	46	35
End.			17	56	58
Latitude of the Moon at the Beginning.	South Deſcend.			3	10
End.				13	56

A Type of the Eclipſe.



CHAP. VIII.

To finde the Declination and Right Aſcenſion of any point given, not exceeding five Degrees of Latitude.

Albeit, in the ſecond Book, I have variouſly ſhewed how to finde the Declination, Right Aſcenſion, Aſcenſionall Difference, Oblique Aſcenſion, and point aſcending by the Doctrine of Trigonometry, yet conſidering that way is not altogether ſo expedite and ready for practiſe, as ſome may deſire, I ſhall therefore here ſhew how to finde the ſame with more ſpeed, for the more quick Calculating the Suns Eclipſe.

To finde the Declination.

Enter the Table entituled [*A Table of Declinations*] finding the Signe and Degree in the firſt Column deſcending on the left hand, and the Latitude on the Head, and in the common angle (by making proportion for the intercepted minutes) is the Declination required.

To finde the Right Aſcenſion.

In like manner, enter the Table of Right Aſcenſions, and you have your deſire.

EXAMPLE. At the time of the true Conjunction of Sun and Moon to be 1654. *Auguſt* $1^{d}\ 22^{h}\ 0'\ 43''$. I require the Declination and Right Aſcenſion of the

Sun and Moon : The Sun is then in ♌ 19ᵈ 34′ 25″, and the Moon in the ſame place, with North Latitude 29′ 7″: Therefore (firſt) to finde the Suns Declination, I enter the Table, finding ♌ 19ᵈ, againſt which, in the ſecond Column, is 15ᵈ 11′, the Declination anſwering thereunto : But becauſe the minutes of the Suns place are not to be found; therefore, to take the proportionall part, I take the difference of Declinations between 19ᵈ and 20ᵈ, which is 18′; then by the Sexagenary Table, the proportionall part is thus to be extracted :

As 1ᵈ or 60′, is to 18′; ſo is 34′ 25″, to 10′ 19″.

	18	00	
	10	12	
		7	30
Part Proportionall		19	30

Which 10′ 19″ being ſubſtracted from the Declination before found (becauſe the Declination decreaſeth) there remaineth 15ᵈ 0′ the Declination of the Sun required.

But to finde the Moons declination, (or any other Star not exceeding 28ᵈ Declination) you are to finde her place in the firſt column, and her Latitude on the Head (having reſpect to that face of the Table, which agrees with your Latitude) and in the angle of meeting is her Declination; onely remember to take the proportionall Part, for the intercepted minutes. Thus, at the time of the true Conjunction of the ☉ and ☾ to be *Auguſt* 1654, her place is 19ᵈ 34′ 25″ ♌, and her Latitude 29′ 7″ North, and therefore her Declination 15ᵈ 27′.

After the ſelf ſame manner is found the right Aſcenſion of the Sun, Moon and ſtars, by the Table of Right Aſcenſions.

CHAP. XXIII.

To finde the Right Aſcenſion of the Medium Cœli.

TO the Right Aſcenſion of the ☉, adde the time afternoon (being reduced into degrees and minutes of the Æquator) the Aggregate, if it exceed not 360ᵈ, is the Right Aſcenſion of the *Medium Cœli*, but if it be greater, ſubſtract 360ᵈ therefrom, and the reſidue will be the Right Aſcenſion deſired. As at the time of the true Conjunction of the ☉ and ☾ before mentioned in *Auguſt* 1654, the Right Aſcenſion of the ☉ is 142ᵈ 0′ 28″, and the time given 22ᵈ 0′ 43″.

The Operation.

	D	′	″
Right Aſcenſion of the Sun	142	00	28
Houres 22	330	00	00
Minutes 00	0	00	00
Seconds 43		10	45
Aggregate	472	11	13
Circle ſubſtracted	360	00	00
Right Aſcenſ. of *Medium Cœli*	112	11	13

Now if you adde 90ᵈ to the Right Aſcenſion of the *Medium Cœli*, the ſumme will be the Oblique Aſcenſion of the Point riſing 202ᵈ 11′ 13″.

CHAP. XXIV.

To finde the point of the Ecliptique Aſcending.

HAving found the Oblique Aſcenſion of the Point Orient by the former Chapter, enter the Table of the Oblique Aſcenſions of the Ecliptique, and having found the Latitude of your place in the front of the Table, deſcend the ſaid Row, till you finde the Oblique Aſcenſion given, againſt which, towards the left hand, you have the Sign and Degree aſcending, onely you muſt remember to take the Proportionall part for the intercepted Degrees, as before we ſhewed.

EXAMPLE. The Oblique Aſcenſion before given, is $202^{d}\ 11'\ 13''$, and therefore the Point riſing in the Latitude of $51^{d}\ 32'$ is $15^{d}\ 37'$ ♎, whoſe oppoſite place $15^{d}\ 37'$ ♈, is the point ſetting and the intermediate Point, *viz.* $15^{d}\ 37'$ ♋, is the *90*^{d} (or greateſt Altitude) of the Ecliptique at that moment.

CHAP. XXV.

To finde when the Sun *ſhall be Eclipſed, and when not, at the time of the viſible Conjunction of the* Sun *and* Moon.

BEcauſe the Sun is not Eclipſed in every Conjunction, but when it happeneth neer one of the Nodes, and ſo hath little or no Latitude, its expedient, I here inſert the two Rules uſed of Aſtronomers, to find certainly when the Sun wil be eclipſed, and when not, the one whereof hath been in great eſteem with Antiquity, notwithſtanding the other is more exact, but withall more difficult, both which in their order are here ſet down.

Rule 1.

If the middle motion of the Moons Latitude at the time of the middle Conjunction of the Sun and Moon, be diſtant from the North Node leſſe then $20^{d}\ 40'$ or from the South Node leſſe then $11^{d}\ 22'$, the Sun may be eclipſed at that Conjunction.

EXAMPLE. At the time of the middle Conjunction of the Luminaries, which is to happen 1654 *Auguſt* 1 $22^{h}\ 2'\ 44''$, the middle motion of the Moons Latitude is $5^{s}\ 26^{d}\ 20'\ 30''$, and therefore Diſtant from the North Node, $3^{d}\ 39'\ 30''$, whereby I gathar the Sun will be eclipſed at that Conjunction.

Rule 2.

If the apparent Latitude of the Moon at the time of the viſible Conjunction be leſſe then the ſumme of the Semidiameters of the ☉ and ☾, the ☉ will then ſuffer Eclipſe, but if greater, the ☉ will ſuffer no Eclipſe at that time.

EXAMPLE. In the ſaid Eclipſe, the apparent Latitude of the ☾ at the time of the viſible Conjunction, will be $5'\ 4''$, which is leſſe then the ſumme of the two Semidiameters, therefore the ☉ will be Eclipſed.

But this Rule is not of ſo much uſe as the former, becauſe it never takes place, till the Calculation be in a manner finiſhed, therefore in the firſt place make uſe of the former, and be ſure the Moon be within the Ecliptique Bounds, and Limits, leſt you ſpend time and pains to no purpoſe.

CHAP. XXVI.

To know whether the Eclipſe of the Sun happens in the Orientall or Occidentall Quarter of the Eclyptique.

HAving found the Point aſcending and deſcending, and the 90^d of the Ecliptique as before is ſhewed; mark if the Eclipſe happen between the 90^d and the Point aſcending, if ſo, it hapneth in the Orientall Quadrant, but if it happen between the ſaid 90^d and the Point deſcending, the Conjunction then hapneth in the Occidentall Quarter of the Ecliptique.

EXAMPLE. At the apparent time of the true Conjunction of the Sun and Moon, to be 1654 *Auguſt* 1^d $22^h 0' 43''$, the Aſcendant is 15^d $37'$ ♎, and the 90^d 15^d $37'$ ♋, therefore the Sun being in 19^d $34'$ $25''$ ♌, is placed between the 90^d and the Horoſcope, whereby, I conclude, the ſaid Conjunction happeneth in the Orientall Quarter of the Ecliptique.

Again, deducting the place of the 90^d, which is 15^d $37'$ ♋, from the place of the ☉, the Remainder is the Diſtance of the ☉, from the 90^d, towards the Point Orient. *viz.* 33^d $57'$ $25''$.

CHAP. XXVII.

To finde the Altitude of the Sun *or* Moon.

IN the tenth Chapter of the ſecond Book, is ſhewed how to finde the Altitude of the Sun or Moon, at any time, by the Doctrine of Sphæricall Triangles, according to which Doctrine, (becauſe its the moſt abſolute of all others) I ſhall here adde an Operation, for finding the ☉ Altitude, the ſaid firſt of *Auguſt* 1654 at 22^h $0'$ $43''$, it being the apparent time of the true Conjunction of the Luminaries in the Meridian of *London*, where:

The Elevation of the Pole is 51^d $32'$ $0''$
The Complement. 38 28 0
Diſtance of ☉ from the Meridian. 29 49 15 which is found by ſubducting the Right Aſcenſion of the *Medium Cœli*, from the Right Aſcenſion of the ☉.

The Operation.

I		II	
Radius 90^d,	10,00000	Co-ſine of 34^d $34'$ $41''$,	9,91558
Tangent 38^d $28'$;	9,90009	Co-ſine of 38 28 0	9,89375
Co-ſine of the angle given 29^d $49'$ $15''$,	9,93831	Co-ſine of 40 25 16,	9,88155
Tangent of 34^d $34'$ $41''$:	9,83840	Sine of 46 23 0:	9,85972

Therefore the Altitude of the of the ☉ in the Meridian of *London* will be at the ſame moment 46^d $23'$ $0''$. After the ſame manner the Altitude of of the ☾ is to be acquired, as is taught in the ſecond Book, tenth Chapter.

CHAP. XXVIII.

To finde the Parallacticall angle according to the Doctrine of the ſecond Book, twentieth Chapter.

AT the apparent time of the true Conjunction of the Sun and Moon, before notified, we have given: (1) the Altitude of the Sun 46^d $23'$ (and therefore his Diſtance from the Zenith 43^d $37'$ $0''$) (2) his Diſtance from the 90^d, towards the Orient 33^d $57'$ $25''$. Hence the Parallacticall will be 45^d $1'$ $46''$, as the following Synopſis makes appear.

Tangent of 43^d $37'$ $0''$,	9,979021
Radius 90^d;	10,000000
Tangent of 33^d $57'$ $25''$,	9,828283
Co-ſine of 45 1 46:	9,849262

CHAP. XXIX

To finde the Parallax of the Moon *from the* Sun *in Altitude, according to the Doctrine of the ſecond Book 22 Chapter.*

AT the apparent time of the true Conjunction, before mentioned, the Diſtance of the Sun from the Zenith is $43^d\ 37'\ 0''$, and the Diſtance of the Moon from the Zenith $43^d\ 16'\ 22''$, alſo the Diſtance of the Sun from the Earth is 101302 and the Diſtance of the Monn 3981, (the Semidiameter of the Earth being $68\frac{1}{2}$) which given, the Operation is as followeth.

In the Sun.			In the Moon.		
	101302.0			39810	
	68.5			68.5	
Summe	101370.5	5,00591	Summe	4049.5	3,60740
Difference	101213.5	5,00532	Difference	3912.5	3,59245
Tangent of $68^d\ 11'\ 30''$,		10,39779	Tangent of $68^d\ 21'\ 49''$,		10,40158
Tangent of 68 9 54:		10,39720	Tangent of 67 40 45:		10,38663
Difference 1 36			Difference 41 4		

Parallax of the Moon in Altitude.	$41'\ 4''$
Parallax of the Sun in Altitude ſubſtract.	1 36
Parallax of the Moon from the Sun in Altitude.	39 28

CHAP. XXX.

To finde the Parallax of the Moon *from the* Sun *in Longitude and Latitude.*

AT the apparent time of the ſaid Conjunction, the Parallacticall angle is $45^d\ 1'\ 46''$, and the Parallax of the Moon from the Sun in Altitude $39'\ 28''$, which known, the Parallax of the Moon from the Sun both in Longitude, and Latitude, according to the ſecond Book 24 Chap. is thus atteined.

I		II	
Radius 90^d,	10,00000	Radius 90^d,	10,00000
Tangent of $39'\ 28''$;	8,05998	Sine of $45^d\ 1'\ 46''$;	9,84971
Co-ſine of $45^d\ 1'\ 46''$,	9,84926	Sine of $39'\ 28''$,	8,05995
Tangent of $27'\ 54''$:	7,90924	Sine of 27 55:	7,90960
Parallax of Longitude $27'\ 54''$.		Parallax of Latitude $27'\ 55''$.	

CHAP. XXXI.

To finde the apparent hourly motion of the Moon *from the* Sun.

Rule. 1 IF the Eclipſe of the Sun happen in the Orientall Quadrant of the Signifer, and the *Parallaxis Longituinis* decreaſe, ſubſtract the *Parallaxis Longitudinis*, in one hour or half hour, from the true hourly or half hourly motion of the ☾ from ☉; but if the *Parallaxis Longitudinis* encreaſe, adde the ſaid Difference.

Rule 2 If the Sun all the time given, be in the Occidentall Quadrant, and the *Parallaxis Longitudinis* decreaſe, adde the Difference of the *Parallaxis Longitudinis* to the hourly, or half hourly motion of the Moon from the Sun, otherwiſe ſubſtract the ſame from the true hourly or half hourly motion, if the *Parallaxis Longitudinis* increaſe.

Rule 3 If the true Conjunction happen in the 90^d of the Ecliptique, ſo that the former part of the Eclipſe happeneth in the Orientall, and the latter part in the Occidentall Quadrant, in which caſe ſubſtract the Difference of the *Parallaxis Longitudinis* from the true hourly motion of the ☾ from the ☉, and the Reſidue will be the hourly motion of the ☾ from the ☉ ſeen.

EXAMPLE. In the year 1654, *Auguſt* 1^{d} 22^{h} 0′ 43″, the true hourly motion of the Moon from the Sun, is 32′ 41″, and the *Parallaxis Longitudinis*, 27′ 54″, and becauſe the Conjunction happeneth in the Orientall Quarter of the Ecliptique, I get the *Parallaxis Longitudinis*, to the hour preceeding, which I finde to be 35′ 9″, the Difference is 7′ 15″, and becauſe the *Parallaxis Longitudinis*, decreaſeth, I deduct the ſaid Difference from the true hourly motion 32′ 41″, and the Remainder 25′ 26″, is the hourly motion of the Moon from the Sun ſeen to the hour preceeding the true Conjunction.

CHAP. XXIX.

To finde the Intervall, or ſpace between the true and apparent Conjunction of the Luminaries.

TO the time of the true Conjunction, compute the *Parallaxis Longitudinis*, of the Moon from the Sun, and if it be leſſe then the hourly motion ſeen, divide the ſame by the hourly motion ſeen, and the Quotient will be the Intervall, or ſpace between the true and apparent Conjunction, to be ſubſtracted from the time of the true Conjunction in the Orientall Quadrant, and to be added in the Occidentall. But if the *Parallaxis Longitudinis* be greater then the hourly motion of the Moon from the Sun ſeen, firſt take the hourly motion ſeen out of the *Parallaxis Longitudinis*, and the Reſidue part by the hourly motion of the Moon from the Sun ſeen; for the hour wherein it fals, and the Quotus will give the ſpace of time above one hour, between the true and apparent Conjunction, either to be added to the time of the true Conjunction, or to be ſubſtracted from the ſame, according as it happens in the Orientall or Occidentall parts of the Ecliptique, as hath been ſaid before.

EXAMPLE. At the time of the true Conjunction of the Sun and Moon to happen 1654 *Auguſt* 1^{d} 22^{h} 0′ 43″, (which fals in the Orientall Quadrant, according to the 26 Chapter:) at which time the *Parallaxis Longitudinis* is 27′ 54″, from which I deduct the hourly motion ſeen 25′ 26″, and there remains 2′ 28″, therefore I again get the *Parallaxis Longitudinis*, to 15′ of an hour ſooner, and I finde the Difference of the the *Parallaxis Longitudinis* anſwering to 15′ to be, 1′ 34″, and therefore the motion of the Moon from the Sun ſeen agreeing to 15′, is 6′ 36″, by which I divide the Remainder of the *Parallaxis Longitudinis*, 2′ 28″, and the *Quotus* 5′ 29″ is the meaſure of time above one hour, that the viſible Conjunction antecedes the true.

		D	H	′	″
Apparent time of the true Conjunction at *London*,	*Auguſt*	1	22	0	43
Intervall of the true and viſible Conjunction,	*Subſtract*		1	5	29
Time of the viſible Conjunction at *London*,	*Auguſt*	1	20	55	14

If you would know whether this be the exact time of the viſible Conjunction, or no, ſeek the *Parallaxis Longitudinis*, to the time of the viſible Conjunction, and alſo the true diſtance of the Sun and Moon by the true hourly motion, for if theſe two ſhall be equall, you may conclude the viſible Conjunction is truly found, but if otherways, the time of the viſible Conjunction is to be corrected.

EXAMPLE. At the time of the viſible Conjunction to be 1654, *Auguſt*, 1^{d} 20^{h} 55′ 14″, I finde the *Parallaxis Longitudinis* to be 35′ 43″, towards the Eaſt, and the true Diſtance of the Moon from the Sun to be alſo 35′ 43″ towards the Weſt, and becauſe they are equall, I conclude the viſible Conjunction is preciſely found.

CHAP. XXXIII.

To find the apparent Latitude of the Moon *at the time of the viſible Conjunction.*

HAving found the time of the viſible Conjunction, and rectified the place of the Moon to the time of the true Conjunction, then by the true hourly motion, compute the true motion of the Moon for the Intervall or ſpace between the true and apparent Conjunction, which adde to, or ſubſtract from, the true motion of the Moon at the time of the true Conjunction, according as the viſible, precedes or ſucceeds the true, and you ſhall thereby obtein her true place at the time of the viſible Conjunction. In like manner are you to reduce the place of her Node Aſcending to the viſible Conjunction, then deduct the motion of her Node Aſcending, from the true motion of the Moon, the Remainder will be the Anomalie of the Moons Latitude at the time of the viſible Conjunction, by which (according to the 5 Chap.) you may obtein her Latitude, then, as before is taught; you muſt alſo to the ſame inſtant, calculate the *Parallaxis Latitudinis,* then conſider whether they be both of one affection, that is to ſay, both North, or both South, if they be, adde her Parallax and Latitude together, but if they be of different affections, namely, the one North, and the other South, then ſubſtract the leſſer from the greater, for ſo the Aggregate, or Difference, wil ſhew the apparent Latitude of the Moon at the time of the viſible Conjunction, either Northward, or Southward, which you may always know by the propriety of the greater number, for the Latitude of the Moon ſeen will be of the ſame Denomination and Species that the greater number is of, &c.

An illuſtration by Example.

		S	D	′	″
Place of ☾ at time of the true ☌.		4	19	34	25
Motion of ☾ agreeing to the Intervall of the true and viſible ☌.	*Subſtr.*			38	17
True place of ☾ at time of the viſible ☌.		4	18	56	8
Place of her Node Aſcend. at time of the viſible ☌.	*Subſtract*	10	25	9	12
True motion of ☾ Latitude from ☊ at time of viſible Conjunction.		5	23	46	56
Therefore her true Latitude.	*North Deſc.*			32	27
Parallaxis Latitudinis of ☾ from ☉.	*South Subſtract*			26	47
Reſts Latitude of ☾ ſeen.	*North Deſcend.*			5	40

CHAP. XXXIV.

To finde how many Digits the Sun *will be Eclipſed.*

FRom the Aggregate of the Semidiameters of the Sun and the Moon, deduct the apparent Latitude of the Moon at the time of the viſible Conjunction, the Remainder will be the Parts deficient, which being obteined: the Analogie is.

As the Diameter of the Sun 32′ 28″, is to 12 Dig. ſo is the Parts Deficient 27′ 6″, to 10 Dig. 0′ 59″.

The Operation by the Sexagenary Table.

	′	″		
	27	6		
	12			
	5	24		
		1	12	[10 Dig. 0′ 59″.
Aggregate	5	25	12	Therfore the Digits Eclipſed.
Diameter ☉	32	28		are 10 Dig. 0′ 59″.
	5	20		
		4	40	
	5	24	40	
Reſts		0	32	
Diameter ☉		32	28	

CHAP.

CHAP. XXXV.

To finde the Minutes and time of Incidence, Emerſion, and Duration of the Suns *Eclipſe.*

IN the ſecond Book 29 Chap. you have ſufficient Directions to finde the minutes of Incidence, neverthel eſſe it cannot here be amiſſe (according to the fundamentall grounds there delivered) to annex the Operation applyed to our preſent purpoſe.

In the Eclipſe of the Sun before treated of, to be 1654, the Summe of the Semidiameters of the ☉ and ☾ being reduced into ſeconds, is 1966″, and the Latitude of the Moon ſeen 5′ 40″, or (being reduced) 340″.

The Operation.

Summe of the Semidiameters of ☉ and ☾ 1966″
Latitude of the ☾ ſeen 340

Summe 2306 —— 3,362859
Difference 1626 —— 3,211120

Aggregate 6,573979
Minutes of Incidence 32′ 16″, or 1936″. Semi-aggreg. 3,286989

Laſtly, to finde the time of Incidence and Emerſion, we muſt get the hourly motion ſeen, (as is before taught) for the hour preceding the viſible Conjunction, and alſo for the hour ſucceeding it: by the former whereof, divide the minutes of Incidence and the Quotient will be the time of Incidence, and by making Diviſion by the latter, the Quotient will be the time of Emerſion.

As in the Eclipſe of the Sun, to be 1654, *Auguſt* 2d *A. M.* the hourly motion ſeen, to the hour preceding the viſible Conjunction is 27′ 2″, and to the hour ſucceeding it 24′ 45″, therefore, to finde the time of Incidence and Emerſion, I work as followeth:

Minutes of Incidence 32′ 16″
Hourly motion ſeen 1^h before the viſible ☌. } 27 2 [1^h 11′ 37″
Reſts 5 14
Hourly motion 27 2
4 57
0 22
4 57 22
Reſts 16 38
Hourly motion 27 2

Minutes of Incidence 32′ 16″
Hourly motion 1^h following. } 24 45 [1^h 18′ 13″
Reſts 7 31
Hourly motion 24 45
7 12
13 30
7 25 30
Reſts 5 30
Hourly motion 24 45

	H	′	″
Hence the time of Incidence is	1	11	37
The time of Emerſion	1	18	13
The totall duration	2	29	50

CHAP. XXXVI.

To finde the Intervall between the viſible Conjunction, and the greateſt Obſcuration.

WIth the Latitude of the Moonſeen, enter the Table of the Diſtance of the true or viſible ☌ or ☍ ☉ ☾ from the greateſt Obſcuration, and the Diſtance there found, divide by the hourely motion ſeen, the *Quotus* will give the Intervall of time to be added, or ſubſtracted (according to the Titles) to or from the viſible Conjunction, ſo will the Summe, or Difference, ſhew the time of the greateſt Obſcuration.

EXAMPLE. The Latitude of the Moon ſeen in our Eclipſe 5′ 40″, North-Deſcending, giveth the Intervall 29″, with the Title *Adde*, which divided (as in manner aforeſaid) by the hourly motion ſeen, for the hour following the viſible Conjunction 24′ 45″, pointeth out the Intervall of time between the viſible Conjunction and greateſt Obſcuration 1′ 10″ to be added, whereby the greateſt Obſcuration is at 8^{h} 56′ 24″ in the morning, from which ſubſtracting the time of Incidence, ſheweth the beginning of the Eclipſe, and adding thereto the time of emerſion, the Aggregate wil ſhew the time of the ending of the Eclipſe.

		D	H	′	″
Time of greateſt Obſcuration,	*Auguſt*	2	8	56	24
Time of Incidence,	*Subſtract*		1	11	37
Time of the beginning of the Eclipſe.			7	44	47
Time of emerſion.	*Adde*		1	18	13
Time of the end of the Eclipſe			10	14	37

Vide Lib. 2. cap. 3c.

CHAP. XXXVII.

To finde the apparent Latitude of the Moon *at the beginning and ending of the Eclipſe.*

ACcording to the Directions before laid down, calculate the true Latitude of the Moon, and the *Parallaxis Latitudinis*, both to the time of the beginning and ending of the Eclipſe, which you are to conferre together, making addition, or ſubſtraction, as you are directed Chapter 33, and you ſhall have the *Latitudo apparens*, or Latitude ſeen, both to the beginning and ending of the Eclipſe.

EXAMPLE. At the beginning of the Eclipſe, the true Latitude of the Moon is 35′ 58″ North, and the *Parallaxis Latitudinis*, 26′ 49″ South, and becauſe they are of different affections, I take their Difference 9′ 9″, which ſheweth that the Latitude of the Moon ſeen at the beginning of the Eclipſe, is 9′ 9″ North. Again, at the end of the Eclipſe, the Latitude of the Moon is 28′ 22″ North, and the *Parallaxis Latitudinis* 28′ 12″ South, which deducted from the former, leaveth the Latitude of the Moon ſeen at the end of the Eclipſe 0′ 10″ North.

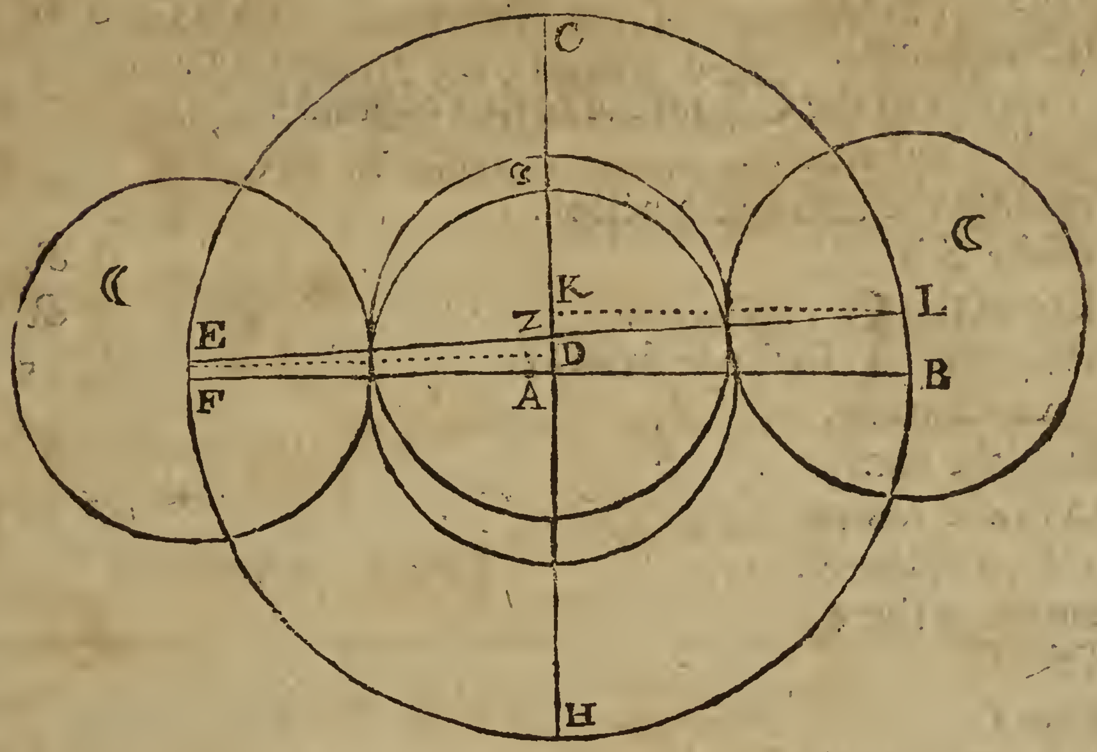
CHAP. XXXVIII.

To deſcribe the Eclipſe of the Sun in plano.

THe Delineation of the Suns Eclipſe differs not much from the Moons, for in the following Figure, on the Point A, (the interſection of the Orthogonall lines) draw a Circle, which may contein the Semidiameters of the Sun and Moon, and then place the apparent Latitude at the beginning and ending of the Eclipſe, as you were directed in the Moons Eclipſe.

EXAMPLE. In the Eclipſe of the Sun to be 1654, *Auguſt* 2^{d}, the Semidiameter of the Sun is 16′ 14″, and the Semidiameter of the Moon 16′ 32″, alſo the apparent Latitude of the Moon at the beginning is 9′ 9″ North, and at the end 0′ 10″, North, therefore (in the Figure following) on the Center A, I deſcribe a Circle repreſenting the Sun, whoſe Semidiameter A C ſhall contein 16′ 14″, then from the Center A, upon the line A C, I number the apparent Latitude in the beginning of the Eclipſe 9′ 9″ North, drawing forth the line K L, parallel to A B, and likewiſe from the Center A, upon the line A C, I number the *Latitudo apparens*, at the end of the Eclipſe 0′ 10″ North, drawing the line D E, parallel to A F, then extend a line from L to E, which ſhall ſignifie the way of the Moon during the time of the Eclipſe, upon which line deſcribe three Moons, whereof the firſt upon the Center L, ſhews her place at the beginning of the Eclipſe, the ſecond upon the Center Z, ſhews her place at the middle of the Eclipſe, and the third upon the Center E, ſhews her place at the end of the Eclipſe, as may appear by the following Scheme.

A Figure thereof.



CHAP XXXIX.

A Synopſis of the Calculation.

		S	D	′	″
		D	Ho.	′	″
The middle Conjunction of the Luminaries.	*Auguſt*	2	10	2	44
The Intervall of the middle and true Conjunction.	*Subſ.*		11	52	37
The middle time of the true Conjunction.	*Auguſt*	1	22	10	7
Æquation of Time.				6	55
The apparent time of the true Conjunction.	*Auguſt*	1	22	3	12
The Co-æquate Anomalie of the ⊙.		1	13	36	52
The Co-æquate Anomalie of the ☾.					
The true place of ⊙ (and ☾ in her Orbite.)		♌	19	34	25
Motion of the Moons Node Aſcending.		10	25	9	3
Hence the Anomalie of her Latitude from ☊.		5	24	25	22
Therefore her true Latitude.	*North Deſcending*			29	7
Reduction adde.				1	21
Place of ☾ in the Ecliptique.		♌	19	35	46
⊙				2	24
Hourly motion of the ☾.				35	5
☾ from ⊙.				32	41
By which dividing the Reduction, the Quotient in time is	*Subſt.*			2	29
Exact time of the true Conjunction at *London.*	*Auguſt*	1	22	0	43
At which time the ⊙ is diſtant from the Meridian.			29	49	15
And the ☾.			29	58	26
Declination of the ⊙.			15	0	3
Declination of the ☾.			15	27	43
Right Aſcenſion of the ⊙.			142	0	28
Right Aſcenſion of the ☾.			142	9	39
Altitude of the ⊙.			46	23	0
Altitude of the ☾.			46	43	38
Diſtance of the ⊙ from the Earth.			101302		
Diſtance of the ☾ from the Earth.			3981		
Parallax of the ⊙ in the Circle of Altitude.				1	36
Parallax of the ☾ in the Circle of Altitude.				41	4
Parallax of the ☾ from the ⊙ in the Circle of Altitude.				39	28
Right Aſcenſion of the *Medium Cœli.*			112	11	13
Adding 90ᵈ. giveth the Oblique Aſcenſion of the point riſing.			202	11	13

Therefore

		D	H	′	″
		S	D	′	″
Therefore the point riſing is.			15	37	♎
The 90^{d} of the Ecliptique.			15	37	♋
The Parallacticall angle.			45	1	46
Hence the Parallax of the ☾ from the ☉ in Longitude.				27	54
And the Parallax in Latitude.				27	55
To one hour preceding the true Conjunction.	*viz.*		21	0	43
The place of the ☉ is		♌	19	32	1
And the place of the ☾.		♌	18	59	20
The Anomalie of the ☾ Latitude from ☊.		5	23	50	9
Hence her true Latitude.				32	10
Declination of the Sun.			15	0	49
Declination of the Moon.			15	41	42
Right Aſcenſion of the ☉.			141	58	5
Right Aſcenſion of the ☾.			141	36	31
Altitude of the ☉.			38	58	39
Altitude of the ☾.			39	44	5
Diſtance of the ☉ from the Earth.			101302		
Diſtance of the ☾ from the Earth.			3979		
Parallax of the ☉ in Altitude.				1	49
Parallax of the ☾ in Altitude.				46	1
Parallax of the ☾ from the ☉ in Altitude.				44	12
Right Aſcenſion of the *Medium Cœli.*			97	8	50
Oblique Aſcenſion of the point riſing.			187	8	50
Hence the point riſing is			2	5	♎
The 90^{d} of the Ecliptique.			2	5	♋
The Parallacticall angle.			37	20	58
Parallax of ☾ from ☉ in Longitude.				35	9
Parallax of ☾ from ☉ in Latitude.				26	49
Difference of the *Parallaxis Longitudinis* in the hour given.				7	15
Hourly motion of ☾ from ☉ ſeen.				25	26
Which ſubſtracted from the *Parallaxis Longitudinis* at the time of the true Conjunction, leaveth.				2	28
To one hour 15′ preceding the true Conjunction, *viz.*	*Aug.*	1	20	45	43
The place of the ☉ is.		♌	19	31	25
The place of the ☾.		♌	18	50	34
Anomalie of the Moons Latitude from ☊.		5	23	41	21
True Latitude of the ☾.	*North*			32	56
Declination of the ☉.			15	0	59
Declination of the ☾.			15	45	8
Right Aſcenſion of the ☉.			141	57	32
Right Aſcenſion of the ☾.			141	28	9
Altitude of the ☉.			36	54	6
Altitude of the ☾.			37	46	27
Diſtance of the ☉ from the Earth.			101302		
Diſtance of the ☾ from the Earth.			3979		
Parallax of the ☉ in Altitude.				1	52
Parallax of the ☾ in Altitnde.				47	15
Parallax of the ☾ from the ☉.				45	23
Right Aſcenſion of the *Medium Cœli.*			93	23	17
Oblique Aſcenſion of the Horoſcope.			183	23	17
Therefore the Horoſcopie, or point riſing is.		♎	2	23	35
The 90^{d}.		♋	2	23	35
The Parallacticall angle.			36	0	43
Parallax of the ☾ from the ☉ in Longitude.				36	43
Parallax of the ☾ from the ☉ in Latitude.				26	41
True motion of the ☾ from the ☉ agreeing to 15′.				8	10

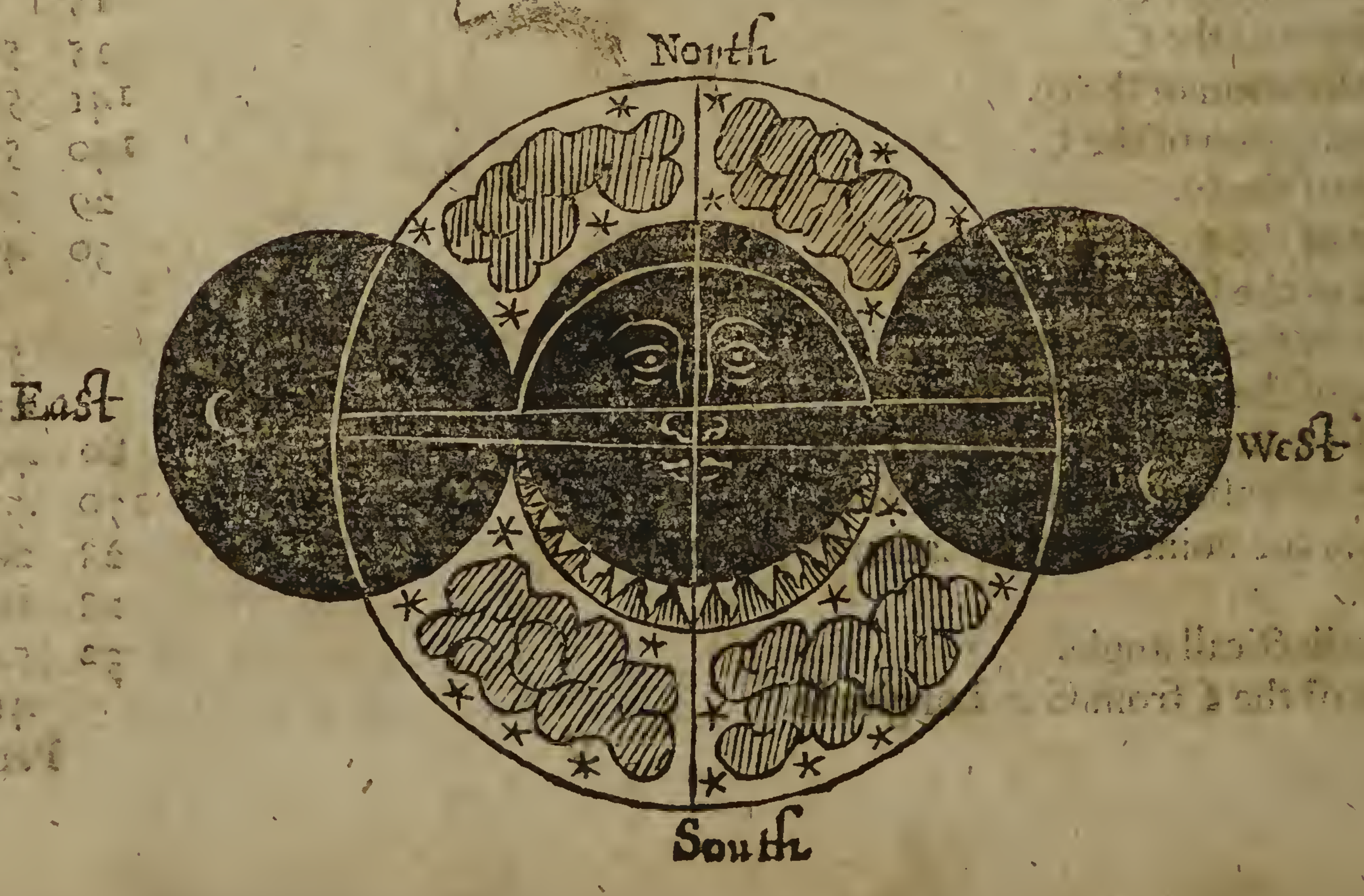
Difference

		S	D	′	″
Difference of the *Parallaxis Longitudinis* agreeing to 15′;	*Subſtract*			1	34
Motion of the ☾ from ☉ ſeen, agreeing to 15′.				6	36
By which dividing the Parallax before remaining, it giveth in time				5	29
Therefore the Intervall of the true and viſible ☌.	*Subſtract.*		1	5	29
Hence the viſible Conjunction happeneth.	*Auguſt*	1	20	55	14
At which time the ☉ is in.		♌	19	31	48
And the ☾.		♌	18	56	8
Anomalie of the ☾ Latitude from ☊.		5	23	46	56
The true Latitude of the ☾.	*North*			32	27
Declination of the Sun.			15	0	53
Declination of the Moon.			15	43	0
Right Aſcenſion of the Sun.			141	57	53
Right Aſcenſion of the Moon.			141	33	10
Altitude of the Sun.			38	13	36
Altitude of the Moon.			39	1	44
Parallax of the ☉ in altitude.				1	50
Parallax of the ☾ in altitude.				46	29
Parallax of the ☾ from the ☉ in altitude.				44	39
Right Aſcenſion of the *Medium Cœli.*			95	46	23
Oblique Aſcenſion of the Point riſing.			185	46	23
The point riſing.			4	5	♎
The 90 degree.			4	5	♋
The Parallacticall angle.			36	51	56
Parallax of the ☾ from ☉ in Longitude.				35	43
Parallax of the ☾ from the ☉ in Latitude.				26	47
True diſtance of the ☉ and ☾.				35	43
Which being exactly æquivalent to the Parallaxis Longitudinis, *ſheweth the viſible ☌ ☉☾ is preciſely obteined.*					
From the true Latitude of the ☾.	*North*			32	27
Taking the *Parallaxis Lat.* it leaveth the Latitude ſeen,	*North*			5	40
Semidiameter of the ☉.				16	14
Semidiameter of the ☾.				16	32
Summe of the Semidiameters.				32	46
Part Deficient.				27	6
Digits Eclipſed, 10^{d} 0′ 59″.		Dig.	10	0	59
Minutes of Incidence.				32	16
To one hour preceding the viſible ☌.	*viz.*		19	55	14
The place of the ☉ is,		♌	19	29	4
The place of the ☾.		♌	18	21	0
Anomalie of the Moons Latitude from ☊.		5	23	11	40
True Latitude of the ☾,	*North*			35	30
Declination of the ☉.			15	1	44
Declination of the ☾.			15	56	15
Right Aſcenſion of the ☉.			141	55	30
Right Aſcenſion of the ☾.			140	59	0
Altitude of the ☉.			29	30	27
Altitude of the ☾.			30	47	4
Parallax of the ☉ in altitude.				2	1
Parallax of the ☾ in altitude.				51	19
Parallax of the ☾ from the ☉.				49	18
Right Aſcenſion of the *Medium Cœli.*			80	44	0
Oblique Aſcenſion of the point riſing.			170	44	0
Therefore the Point riſing in Latitude 51^{d} 32′ is.			23	28	♍
The 90^{d}.			23	28	♊
The Parallacticall angle.			32	54	10
Parallax of the ☾ from ☉ in Longitude.				41	24

	S	D	′	″
Parallax of the ☾ from ☉ in Latitude.			26	47
To one hour after the viſible ☌, *viz.*		21	55	14
The place of the ☉ is	♌	19	34	12
And the place of the ☾.	♌	19	31	13
Anomalie of the Moons Latitude from ☊.	5	24	22	10
The true Latitude of the ☾.			29	24
Declination of the ☉.		15	0	7
Declination of the ☾.		15	29	0
Right Aſcenſion of the ☉.		142	0	15
Right Aſcenſion of the ☾.		142	7	0
Altitude of the ☉.		45	46	54
Altitude of the ☾.		46	9	25
Parallax of the ☉ in Altitude.			1	37
Parallax of the ☾ in Altitude.			41	30
Parallax of the ☾ from the ☉.			39	53
Right Aſcenſion of the *Medium Cœli*.		110	48	45
Oblique Aſcenſion of the point riſing.		200	48	45
Therefore the point riſing in Latitude 51ᵈ 32′ is.		14	39	♎
The 90ᵈ of the Ecliptique.		14	39	♋
The Parallacticall angle.		44	9	15
Parallax of ☾ from ☉ in Longitude.			28	37
Parallax of ☾ from ☉ in Latitude.			27	47
Hourly motion of ☾ from ☉ ſeen to 1 hour before the viſible ☌.			27	2
Hourly motion of ☾ from ☉ ſeen to 1 hour after the viſible ☌.			24	45
Dividing the minutes of Incidence by the hourly motion ſeen to 1 hour before the viſible ☌, giveth the time of Incidence.		1	11	37
So dividing the min. of Incidence by the hourly motion ſeen to 1 hour after the viſible ☌ 24′ 45″, giveth the time of Emerſion.		1	18	13
The totall Duration.		2	29	50
The Latitude of the ☾ ſeen 5′ 40″ North Deſc. giveth the Intervall 29″, *Adde*, which divided by the hourly motion (the hour after the viſible ☌) giveth the Intervall of time between the viſible ☌ and the greateſt Obſcuration to be added.			1	10
Latitude of the Moon ſeen at Beginning *North Deſc.*			9	9
Latitude of the Moon ſeen at Ending. *North Deſc.*			0	10

	Ho	′	″
Beginning of the Eclipſe at *London*	7	44	47
The time of the viſible Conjunction	8	55	14
The greateſt Obſcuration.	8	56	24
The end of the Eclipſe.	10	14	37

A Type of the Eclipſe.



AN APPENDIX:

Conteining ſuch Obſervations of the Planets Places, as have been made by the Author and others.

§ 1. *Obſervations of the* Suns *Place.*

ANno 1586, Noble *Tycho* obſerved the Vernall Æquinoctiall the 10 day of March, at 9 houres 2 min. P. M.

For the difference of Meridians of *London* and *Uraniburg*, muſt be ſubſtracted 50 min. hence the time in the Meridian of *London* is March the 10 day, 8 hou. 12 min.

	☉				Aphel. ☉				
	S	D	′	″	S	D	′	″	
The middle motion of the Sun is	11	27	57	50	3	5	28	15	
Aphelion of the Sun ſubſtracted	3	05	28	15					
Anomalie of the Sun.	8	22	29	35					
Æquation of the Sun added		2	02	10					
Therefore the Sun was in	♈	00	00	00					Agreeing to Obſervatiō.

Anno 1588, March 9^{d} 20^{h} $45'$ *Tycho* again obſerves the Vernall Æquinox at *Uraniburge*.

	☉				Aphel. ☉				
	S	D	′	″	S	D	′	″	
The middle motion of the Sun.	11	27	58	01	3	5	30	19	
Aphelion of the Sun ſubſtracted	3	05	30	19					
Anomalie of the Sun	8	22	27	42					
Æquation of the Sun added		2	02	10					
Therefore the Sun was in	♈	00	00	11					Differing but ⅙ of a minute from Obſervation.

The Illuſtrious Prince *William Landgrave* of *Haſſia*, *Anno* 1572, October the 3^{d} at Noon, he obſerved the ☉ in 20^{d} $0'$ ♎: See the *Haſſiaque* Obſervation publiſhed by *Snellius*: The difference of Meridians is $38'$: therefore at *London* the time is, October 2^{d} 23^{h} $22'$, at which time the ☉ place is required.

	☉				Aphel. ☉			
	S	D	′	″	S	D	′	″
Middle motion of the Sun	6	22	01	05	3	05	14	28
Aphelion of Sun ſubſtracted	3	05	14	28				
Anomalie of the Sun	3	16	46	37				
Æquation of the Sun ſubſt.		1	58	27				
The Suns true place	6	20	02	38				

Here the difference between the Calculation and Obſervation is $2'$ $38''$, which is not a difference perceptable, but I queſtion the Obſervation, becauſe other Obſervations ſeeme to contradict it, beſides, I dare be bold to ſay (with *Eichſtade*) that ſo ſmall a difference, ſhould it be *hallucinous*, could not blemiſh the certainty of my Tables, For that the moſt exact and accurate Tables in being, or that may be expected, can ſeldome or never levell (in the places of the ☉ ☾ and Stars) neerer then the 15 part of a Degree, as all Aſtronomers teſtifie with joynt conſent; which I may alſo affirm of many Obſervations, wherein errour may ariſe, either by fallacy of the Inſtrument, or want of care, and albeit the Inſtrument be exact, and never ſo much Circumſpection uſed, yet a difference will many times be, conſidering the parvity, and inſenſible magnitude the Inſtrument bears to the vaſt diſtance of the Object.

§ 2. *An Obſervation of the Moon and the Star called* Aldebaran, *or* the Buls eye.

ANno 1644, *December* 29^{d} at 9^{h} 15′ *P. M.* I obſerved that the higher part of the Moon did cover, and eclipſe the *Buls eye* from my ſight, and this Obſervation was made at *N. Luffenham*, where the Elevation is 52^{d} $\frac{2}{3}$, and the diſtance of the Meridian from *London* 3′ *ad Occaſum*.

The true place of the Sun from the Earth was then 19^{d} 9′ 30″ ♑, and the middle motions of the Moon as followeth.

☾		Aphel. ☾	Node Aſc. ☽
s d ′ ″		s d ′ ″	s d ′ ″
2 04 08 52		7 09 19 06	5 00 40 44
7 09 19 06	Aphelion of the Moon ſubſtracted.		
6 24 49 46	Anomalie of the Moon.		
02 02 08	Æquation adde.		
6 27 00 54	Anomalie of the Moon æquated.		
2 06 20 00	Place of the Moon æquated.		
9 19 09 30	True place of the Sun.		
4 17 10 30	Diſtance of the Moon from the Sun.		
27 42	Proportionall minutes.		
01 17 10	The Variation and Reflection ſubſtract.		
2 05 02 50	Therefore the Moons true place in her Orbite.		
5 00 40 44	Node Aſcending ☾ ſubſtract.		
9 04 22 06	True motion of the Moons Latitude.		
01 03	Reduction Adde.		
♊ 05 03 53	True place of the Moon in the Ecliptique.		
04 59 07	Simple Latitude of the Moon.		
16 57	Exceſſe.		
08 50	The Proportionall part Adde.		
05 07 57	Therefore the true Latitude of the ☾ South.		

According to the Doctrine of the ſecond Book 24 *Chap.* the Parallax of the Moon in Longitude was 9′ 10″, in Latitude 35′ 35″, and becauſe the Moon was in the Occidentall Quadrant of the Signifer, her Parallax of Longitude muſt be deducted from her true place, therefore the Viſible place of the Moons Center was 4^{d} 54′ 43″ ♊, and her Apparent Latitude 5^{d} 43′ 32″ towards the South. At the ſame time the true place of *Aldebaran*, was 4^{d} 58′ 49″ ♊, and the Latitude 5^{d} 31′ South, hence the Difference of Longitude is 5′ 54″, and the Difference of Latitude 12′ 32″: ſo that the Star *Aldebaran*, was diſtant from the Center of the Moon towards the North-Weſt 13′ 58″, but tbe Semidiameter of the Moon was 16′ 54″, and therefore covered *Aldebaran*, exactly as I obſerved at *North-Luffenham*.

§ 3. *Obſervations of* Saturn.

ANno 1583, *September* 3^{d} at 1^{h} *P. M.* in the Meridian of *Vraniburge*, noble *Tycho* obſerved ♄ exactly in Opppoſition of the Sun, in 19^{d} 50′ ♓.

For the Difference of Meridians is to be ſubſtracted 50′, therefore the time in the Horizon of *London*, was 3^{d} 0^{h} 10′, at which time we ſhall firſt enquire the place of the Sun.

	s d ′ ″
The middle motion of the Sun.	5 21 49 29
Aphelion of Sun ſubſtracted.	3 05 25 41
Anomalie of the Sun.	2 16 23 48
Æquation of the Sun ſubſtract.	01 58 38
Therefore the Suns place was.	5 19 50 51
And the Diſtance of ☉ from the Earth	100452 parts

Aphel. ☉.
s d ′ ″
3 05 25 41

	s d ′ ″
Middle motion of ♄.	11 26 25 13
Aphelion of ♄ ſubſtract.	08 25 36 49
Anomalie of ♄ Excent.	03 00 48 24
Æquation ſubſtract.	00 06 34 49
Place of ♄ from ☉ in his Orbe	11 19 50 24
Node Aſcend. ſubſtract.	03 20 22 03
Reſts.	07 29 28 21
Reduction ſubſtract.	00 00 01 28
Place of ♄ from ☉ in Eclipt.	11 19 48 56
Place of ☉.	05 19 50 51
Anomalie of Commutation.	06 00 01 55
Complement to the Circle.	05 29 58 05
Half ſumme.	00 89 59 02
Parallax of the Orbe ſubſtract.	00 00 00 13
True motion of ♄ from the Earth.	11 19 48 43
That is in	♌ 19 48 43

Place of Sun $19^d\ 50'\ 51''$ ♍.
Diſtance of ☉ from Earth 100452.

Argument of Latitude, therefore the Inclination is $2^d\ 9'\ 37''$, the Reduction $1'\ 28''$, and the Curtation 677 parts.

955656 ♄ from ☉ *in Orbitâ*
677 Curt. Sub.
954979 Diſtance Curtated.
100452 Diſt. of Earth from ☉

Summe 10554|31 4,023430
Differ. 8545|27 3,931725
Tangent of $89^d\ 59'\ 2''$, 13,552110
17,483835
Tangent of 89 58 49 13,460405
0 0 13. Par. of the orb

Anno 1639, *November* 4^d at $8^h\ 0'$ *P. M.* *Bullialdus* obſerved ♄ in $12^d\ 38'$ ♒: for the difference of Meridians is to be added 10′, ſo that the time of Obſervation in reſpect of the Meridian of *London*, was $8^h\ 10'$, at which time.

	s d ′ ″
The middle Motion of the ☉ is	7 23 40 57
Aphelion of the ☉ ſubſtract.	3 06 23 12
Anomalie of the Sun.	4 17 17 45
Æquation ſubſtract.	01 24 48
Therefore the true place of Sun.	7 22 16 09
And his Diſtance from the Earth.	98711

	s d ′ ″
Middle motion of ♄.	10 23 39 07
Aphelion of ♄ ſubſtract.	c8 26 51 58
Anomalie of ♄.	01 26 47 09
Æquation ſubſtract.	00 05 17 47
Place of ♄ from ☉ in his Orbite.	10 18 21 20
Node Aſcend. ſubſtract.	03 20 55 55
Reſts.	06 27 25 25
Reduction ſubſtract.	00 00 01 22
Place of ♄ from ☉ in the Eclipt.	10 18 19 58
Place of ☉ from the Earth.	07 22 16 09
Anomalie of Commutation.	09 03 56 11
Complement to the Circle.	02 26 03 49
Half ſumme.	00 43 01 54
Parallax of the Orbe ſubſtract.	00 05 40 09
True motion of ♄ frō the Earth.	10 12 39 49
Therefore ♄ in.	♒ 12 39 49

Diſtance of ♄ from ☉ in his Orbite 985466.

Argument of Latitude, which gives the Inclination $1^d\ 9'\ 17''$, the Reduction $1'\ 22''$, and the Curtation 196.

985270 Diſtance of ♄ Curtated.
98711 Diſtance of Earth from ☉.

Summe 10839|81 4,035023
Differ. 8865|59 3,947706
Tangent of $43^d\ 1'\ 54''$ 9,970137
13,917843
Tangent of 37 21 45 9,882820
Difference 5 40 9 Par. of Orbe.

§ 4. *Obſervations of* Jupiter.

ANno 1591, Aprill the 23ᵈ 19ʰ 0′ in the Meridian of *Uraniburge*, *Tycho Brahe* obſerved ♃ then in oppoſition of the ☉ in 13ᵈ 10′ ♏.

Deducting 50′ for the difference of Meridians, giveth the time at *London* 23ᵈ 18ʰ 10′, at which time we are to compute the places of ☉ and ♃ as in the following Synopſis.

In ☉	S	D	′	″
Middle motion of the Sun	1	11	31	58
Aphelion of the Sun ſubſtracted	3	05	33	29
Anomalie of ☉	10	05	58	29
Æquation added		1	37	56
True place of the ☉	1	13	09	54
And his Diſtance from the Earth	101076			

In Jupiter.

	S	D	′	″
Middle motion of ♃	7	16	30	14
Aphelion of ♃ ſubſtracted	6	07	44	35
Anomalie of the Excent. of ♃	1	08	45	39
Æquation ſubſtract.		3	18	50
Place of ♃ from ☉ in his Orb.	7	13	11	24
Node Aſcend. ſubſtract.	3	05	23	53
Argument of Latitude	4	07	47	31
Reduction Adde.				28
Place of ♃ from ☉ in Eclipt.	7	13	11	52
Place of ☉	1	13	09	54
Anomalie of Commutation.	5	29	58	02
Halfe Summe		89	59	01
Parallax of the Orbe adde.				27
True motion of ♃ from Earth	7	13	12	19
Therefore ♃ is in	♏	13	12	19

Diſtance therefore of ♃ from ☉ in his Orbe 542446.

Therefore the inclination of ♃ is 1ᵈ 4′ 40″, the Reduction 28″, and the curtation 92 parts.

542354	Diſt. ♃ from ☉ Curtated	
101076	Diſtance of Earth frō ☉	
Summe 643430		3,808503
Differ. 441278		3,644711
Tangent of 89ᵈ 59′ 1″		13,544191
		17,188902
Tangent of 89ᵈ 58′ 34″		13,380399
	27 Parall. of Orbe	

Anno 1595, September the 12ᵈ 6ʰ 10′, (or 5ʰ 20′ in the Meridian of *London*) *Tycho* obſerved ♃ in 28ᵈ 56′ ♓, in Oppoſition of the ☉.

	S	D	′	″
Middle motion of the Sun	6	00	59	50
Aphelion of the Sun ſubſtracted	3	05	38	02
Anomalie of the Sun	2	25	21	48
Æquation ſubſtracted		2	02	11
True place of the Sun	5	28	57	39
His diſtance from the Earth.	100171			

Middle

	S	D	′	″
Middle motion of ♃.	11	29	42	58
Aphelion of ♃ ſubſtract.	6	07	49	03
Anomalie of ♃.	5	21	53	55
Æquation ſubſtract.			49	12
Place of ♃ from ☉ in his Orbite.	11	28	53	46
Node Aſcend. ſubſtract.	3	05	24	51
Argument of Latitude.	8	23	28	55
Reduction ſubſtract.				08
Place of ♃ from ☉ in the Eclipt.	11	28	53	38
Place of the ☉.	5	28	57	39
Anomalie of Commutation.	6	00	04	01
Complement.	5	29	55	59
Half ſumme.		89	58	00
Parallax of the Orbe ſubſtract.			1	00
True mot. of ♃ from the Earth.	11	28	52	38
That is in	♓	28	52	38

♃ from ☉ in his Orbite 497366.

The Inclination is 1^d $21'$ $17''$, the Reduction $8''$, and the Curtatiõ 146.

497366 ♃ from ☉ in his Orbite.
146 Curtation ſubſtract.

497220 Diſtance curtated.
100171 Diſtance of Earth frõ ☉.

Summe	597391	3,776256
Difference	397049	3[illegible]98844
Tangent of 89^d $58'0''$,		13,235244
		16,834088
Tangent of 89 57 0		13,057832
		1 0 Paral. of Orbe.

§ 5 *Obſervations of* Mars.

ANno 1591, *June* 8^d 7^h $43'$ the ſtar of ♂ was obſerved in Oppoſition of the ☉ in 26^d $43'$ ♐.

For the Difference of the Meridians of *London* and *Uraniburge*, we are to abate $50'$, & therefore the time of this Obſervation, was (in the Merid. of *London*) at 6^h $53'$.

The Operation.

	S	D	′	″
Middle motion of the ☉.	2	26	24	33
Aphelion of ☉ ſubſtract.	3	5	33	37
Anomalie of the ☉.	11	20	50	56
Æquation of ☉ adde.			19	11
Diſtance of ☉ from the Earth	101780			
True place of the ☉.	2	26	43	44

	S	D	′	″
Middle motion of ♂.	9	05	48	03
Aphelion of ♂ ſubſtract.	4	28	48	24
Anomalie of the Excentr.	4	06	59	39
Æquation ſubſtract.		09	03	35
Place of ♂ from ☉ in his Orbite.	8	26	44	28
Node Aſcend. ſubſtract.	1	16	36	31
Argument of Latitude.	7	10	07	57
Reduction ſubſtract.			00	52
Place of ♂ from ☉ in the Eclipt	8	26	43	36
Place of the Sun.	2	26	43	44
Anomalie of Commutation.	6	00	00	08
Complement.	5	29	59	52
Half ſumme.		89	59	56
Parallax of the Orbe ſubſtract.				30
True mot. of ♂ from the Earth.	8	26	43	06
That is	♐	26	43	

Diſtance of ♂ from ☉ in his Orbe 144674.

The Reduction of ♂ $52''$, the Curtation 33.

Agreeing to Obſervation.

Anno 1644, *November* 27^{d} at 7 in the morning, I obſerved ♂ almoſt ful North, from a ſtar of the third magnitude, call'd *The Heel of the higher Foot of* ♊, he was obſerved by Inſtrument to be 3^{d} $\frac{5}{10}$ from the ſtar towards the North, and about three times his Diameter from the Pole-line towards the Weſt, and becauſe the Right Aſcenſions of ♂, and the ſtar do both agree with the Zodiacall Arch, I concluded, that ♂ wanted juſt ſo much of the ſaid ſtar, in reſpect of Longitude. The Diameter of ♂ was about 3′.

The Operation.

	S	D	′	″
Middle motion of ☉.	8	16	35	16
Aphelion of ☉ ſubſtract.	3	6	28	33
Anomalie of the ☉.	5	10	6	43
Æquation of ☉ ſubſtract.			42	39
Diſtance of ☉ from the Earth.	98336			
True place of the Sun.	8	15	52	37

	S	D	′	″
Middle motion of ♂.	2	11	09	22
Aphelion of ♂ ſubſtract.	4	29	53	19
Anomalie of ♂.	9	11	16	03
Æquation of ♂, Adde.		10	05	58
Place of ♂ from ☉ in his Orbite.	2	21	15	20
Node Aſcend. ſubſtract.	1	17	15	22
Argument of Latitude.	1	03	59	58
Reduction ſubſtract.				49
Place of ♂ from ☉ in the Eclipt.	2	21	14	31
True place of the Sun.	8	15	52	37
Anomalie of Commutation.	5	24	38	06
The half ſumme.		87	19	03
Parallax of the Orbe, Adde.		8	57	24
True mot. of ♂ from the Earth.	3	00	11	55
That is.	♋	00	12	

Diſtance of ♂ from ☉ in his Orbe 156267

Hence the Inclination of ♂ is 1^{d} 2′ 4″ the Reduction 49″, and the Curtatió 25 parts.

156267 ♂ from ☉ in his Orbite.
25 Curtation ſubſtract.

156242 Diſtance of ♂ from ☉ Cur.
98336 Diſtance of Earth from ☉.

Summe 254578,	3,405820
Differ. 57906;	2,762723
Tangent of 87^{d} 19′ 3″,	11,329265
	14,091988
Tangent of 78 21 39	10,686168
Aggr. 165 40 42, Ang. of Eló.	
Diff. 8 57 24, Paral. of Orb.	

Sine of the angle of Elongation 165^{d} 40′ 42″,	9,393339
Sine of the angle of Commutation 5^{d} 21′ 54″;	8,970810
Co-tangent of the Inclination 1^{d} 2′ 4″,	11,743367
	20,714177
Co-tangent of the Latitude of ♂ 2^{d} 44′ 6″:	11,320838

The true place of the ſtar was 0^{d} 21′ ♋, with Latitude 53′ South, the place of ♂, by the former Synopſis being then 0 12 ♋, with Latitude 2^{d} 44′ 6″ North, therefore the Diſtance of ♂ from the ſtar in reſpect of Longitude was 9′ (which is about three times the Diameter of ♂) and in Latitude 3^{d} 37′ towards the North, according as I made Obſervation at *North-Luffenham.*

§ 6 *An Obſervation of* Jupiter *and* Mars.

ANno 1644, *July* 28^{d}, at 2h *A. M.* I obſerved ♃ and ♂ very neer together in the Eaſt, ♃ being elevated above ♂, in reſpect of Latitude 8′, and was diſtant from ♂ about 4′ *ad Ortum*. How my Tables agree hereto, I ſhall here examine.

☉	S	D	′	″
Middle motion of ☉.	4	16	8	0
Aphelion of ☉ ſubſtract.	3	6	28	12
Anomalie of the ☉.	1	9	39	48
Æquation of ☉ ſubſtract.		1	16	58
Diſtance of ☉ from the Earth.	101398			
True place of the Sun.	4	14	51	2

♃	S	D	′	″
Middle motion of ♃.	1	13	41	28
Aphelion of ♃ ſubſtract.	6	08	37	59
Anomalie of the Excent.	7	05	03	29
Æquation Adde.		03	19	30
Place of ♃ from ☉ in his Orbite.	1	17	00	58
Node Aſcend. ſubſtract.	3	05	35	26
Reſts.	10	11	25	32
Reduction adde.				29
Place of ♃ from ☉ in the Eclipt.	1	17	01	27
Place of ☉ from the Earth.	4	14	51	02
Anomalie of Commutation.	2	27	49	35
The half ſumme.		43	54	47
Parallax of the Orbe, Adde.		11	19	38
True mot. of ♃ from the Earth.	1	28	21	05
That is.	♉	28	21	05

Gives the Diſtance of ♃ from ☉ in his Orbe 502064.

Argument of Latitude, w^{ch} gives the Inclination of ♃ 1′ 21″, the Reduction 29″, and the Curtation 83 parts.

502064 ♃ from ☉ in his Orbite.
83 Curtation ſubſtract.

501981 Diſtance of ♃ curtated.
101398 Diſtance of Earth from ☉.

Summe	603379	3,780589
Difference	400983	3,602692
Tangent of 43^{d} 54′ 47″,		9,983520
		13,586212
Tangent of 32 35 9		9,805623

Aggr. 76 29 56 Ang. of Elong.
Diff. 11 19 38 Paral. of Orb.

Sine of the angle of Elongation	76^{d} 29′ 56″,	9,987829
Sine of the angle of Commutat.	87 49 35;	9,999687
Co-tangent of the Inclination.	1 1 21	11,748413
		21,748100
Co-tangent of the Latitude	59′ 42″:	11,760271

♂	S	D	′	″
Middle motion of ♂.	0	07	06	37
Aphelion of ♂ ſubſtract.	4	29	52	56
Anomalie of the Excentr.	7	07	13	41
Æquation Adde.		06	59	14
Place of ♂ from ☉ in his Orbite.	0	14	5	51
Node Aſcend. ſubſtract.	1	17	15	07
Argument of Latitude.	10	26	50	44
Reduction adde.				44
Place of ♂ from ☉ in the Eclipt.	0	14	06	35
Place of the Sun from the Earth.	4	14	51	02
Anomalie of Commutation.	4	00	44	27
Half ſumme.		60	22	13
Parallax of the Orbe Adde.	1	14	08	43
True mot. of ♂ from the Earth.	1	28	15	18
Videlicet	♉	28	15	18

Diſtance of ♂ from ☉ in his Orbite 141643.

The Inclination of ♂ is 1^{d} 0′ 42″. Reduction 44″, and the Curtation 23 parts.

141643 ♂ from ☉ in his Orbite.
23 Curtation ſubſtract.

141620 The Diſtance Curtated.
101398 Diſtance of Earth from ☉.

Summe	243018,	3,385638
Differ.	40222;	2,604464
Tangent of 60^{d} 22′ 13″,		10,245068
		12,849532
Tangent of 16 13 30		9,463894

Aggr. 76 35 42, Ang. of Elóg.
Diff. 44 8 43, Paral. of Orb.

Sine of the angle of Elongation	76^{d} 35′ 43″,	9,988004
Sine of the angle of Commutation	59^{d} 15′ 33″;	9,934240
Co-tangent of the Inclination	1^{d} 0′ 42″,	11,753039
		21,687279
Co-tangent of the Latitude of ♂	1^{d} 8′ 42″:	11,699275

The Difference of Longitude was 5′ 47″, and the Difference of Latitude 9′, hence the Difference of the Calculation from the Obſervation is little above one minute, which æqualizeth the Parallax of ♂ from ♃, and therefore agrees exactly with the Obſervation I made at *North-Luffenham.*

§ 7. *Obſervations of* Venus.

ANno 1649 *April* $11^{d}\ 11^{h}$ *P. M.* I heedfully obſerved the true place of ♀, by her Application to the fixed ſtars, and by help of a large Inſtrument curiouſly divided, I found her true place according to Longitude $17^{d}\ 30'$ ♊, and her Latitude $3\frac{1}{5}$ towards the North, and in this Obſervation, I conſidered her Parallax and Refraction &c.

	S	D	′	″	
Middle motion of the ⊙.	1	0	20	14	
Aphelion of ⊙ ſubſtract.	3	6	33	3	
Anomalie of the ⊙.	9	23	47	11	
Æquation adde.		1	51	13	
Diſtance of ⊙ from the Earth	100748				
True place of the ⊙.	1	2	11	27	*viz.* $2^{d}\ 11'\ 27''$ ♉.

	S	D	′	″
Middle motion of ♀.	5	12	42	49
Aphelion ſubſtract.	10	05	06	37
Anomalie of the Excent.	7	07	36	12
Æquation Adde.			29	14
Place of ♀ from ⊙ in her Orbite.	5	13	12	3
Node Aſcend. ſubſtract.	2	13	28	22
Reſts.	2	29	43	41
Reduction ſubſtract.				2
Place of ♀ from ⊙ in the Eclipt.	5	13	12	01
True Place of the ⊙.	1	2	11	27
Anomalie of Commutation.	4	11	00	34
Half ſumme.		65	30	17
Parall. of Orbe adde to ⊙ place.	1	15	16	42
Place of ♀ from the Earth.	2	17	28	9

Diſtance of ♀ from ⊙ in her Orbite 71910.

The Argument of Latitude, with which I finde the Inclination $3^{d}\ 22'\ 50''$, the Reduct. 2″, & the Curt. 126.

71910 Diſt. of ♀ frō ⊙ in her Orb.
126 Curtation ſubſtract.

71784 Diſtance of ♀ from ⊙ Curt.
100748 Diſtance of Earth from ⊙.

Summe 172532,	4,236870
Differ. 28964;	3,461858
Tang. of $65^{d}\ 30'\ 17''$,	10,341390
	13,803248
Tang. of 20 13 35,	9,566378
Diff. 45 16 42. Parallax of Orb.	

Sine of the angle of Elongation	$45^{d}\ 16'\ 42''$,	9,851584
Sine of the angle of Commutation	48 59 26;	9,877717
Co-tangent of Inclination	3 22 50,	11,228630
		21,106347
Co-tangent of the Latitude of ♀.	$3^{d}\ 11'\ 11''$:	11,254763

Agreeing neer to Obſervation.

Anno 1574, *September* 16^d at 4^h *A. M. Michael Mæſtlin* ſaw ♀ cover the *Lyons Heart*. *Mæſtlin Epit. Aſtron. pag.* 519. *& Kepler in Aſtron. Opticâ pag.* 305.

For the Difference of Meridians I deduct 36′, from the time given, and the Reſidue 3^h 24′ is the time of the obſervation in the Meridian of *London*; to which time I have form'd the following Paradigma.

	S	D	′	″	
Middle motion of the ☉.	6	4	27	26	
Aphelion of the ☉ ſubſtract.	3	5	16	28	
Anomalie of the ☉.	2	29	10	58	
Æquation of ☉ ſubſtract.		2	2	49	
Diſtance of the Earth from ☉.		100056			
Place of ☉ from the Earth.	6	2	24	37	viz. ♎ 2^d 24′ 37″.

	S	D	′	″
Middle motion of ♀.	2	24	37	47
Aphelion ſubſtract.	10	03	59	30
Anomalie of the Excent.	4	20	38	17
Æquation ſubſtract.			30	24
Place of ♀ from ☉ in her Orbite.	2	24	07	23
Node Aſcend ſubſtract.	2	12	43	37
Reſts	0	11	23	46
Reduction ſubſtract.			01	10
Place of ♀ from ☉ in the Eclipt.	2	24	06	13
Place of ☉ from the Earth.	6	02	24	37
Anomalie of Commutation.	8	21	41	36
The Complement to 12 Signes.	3	08	18	24
The half ſumme,		49	09	12
Parallax of the Orb ſubſtract.	1	08	26	10
Place of ♀ from the Earth.	4	23	58	27
That is.	♌	23	58	27

Diſtance of ♀ from ☉ in her Orbite 71920.

Argument of Latitude, therefore the Inclination is 0^d 40′ 3″, the Reduction 1′ 10″, & the Curt. 5 parts.
100056, Diſtance of Earth frô ☉.
71915 Diſtance of ♀ Curtated.

Summe 17197|1	4,235455
Differ. 2814|1	3,449339
Tang. of 49^d 9′ 12″,	10,063184
	13,512523
Tang. of 10 43 2	9,277068
38 26 10 Paralla. of Orb.	

Sine of the angle of Elongation 38^d 26′ 10″,	9,793540
Sine of the angle of Commutation 81^d 41′ 36″;	9,995419
Co-tangent of the Inclination 0^d 40′ 3″,	11,933654
	21,929073
Co-tangent of the Latitude 25^d 10′	12,135533

The true place of *Cor Leonis*, was at the time of this Obſervation in 23^d 54′ 46″ ♌, and the Latitude thereof 26′ and a half North, therefore the Difference of Longitude was 3′ 41″, and the Difference of Latitude 1′ 20″, and in regard the Parallax of ♀ was litle or nothing, it appears (by Calculation) that ♀ then touched the *Lyons Heart*, and did Eclipſe it exactly about half an hour before 4^h in the morning.

§ 8. *An Obſervation of* Venus *and* Mercury.

ANno 1644, *February* 14^d at 6^h *P. M.* I obſerved ♀ and ☿ neer together in the Weſt, at which time I took their Diſtance, finding it to be 3^d and a half, ☿ bearing from ♀ towards the North-Weſt. And this Obſervation I made at *North-Luffenham* with great heed and circumſpection; being at that time very deſirous to try the verity of *Keplers* Tables.

The Operation.

	S D ′ ″	
Middle motion of the ☉.	11 4 9 32	
Aphelion of the ☉.	3 6 27 45	
Anomalie of the ☉.	7 27 41 47	
Æquation Adde.	1 45 13	
Diſtance of the Earth from ☉.	99072	
True place of ☉ from the Earth.	11 5 54 45	*viz.* 5d 54′ 45″ ♓

	S D ′ ″
Middle motion of ♀.	0 25 29 21
Aphelion ſubſtract.	10 05 01 58
Anomalie of ♀.	2 20 27 23
Æquation ſubſtract.	46 45
Place of ♀ from ☉ in her Orbite.	0 24 42 36
Node Aſcend. ſubſtract.	2 13 25 16
Reſts.	10 11 17 20
Reduction adde.	2 57
Place of ♀ from ☉ in the Eclipt.	0 24 45 33
Place of the Sun from the Earth.	11 05 54 45
Anomalie of Commutation.	1 18 50 48
Half ſumme.	24 25 24
Parallax of the Orbe Adde.	20 22 06
True mot. of ♀ from the Earth.	11 26 16 51

Diſtance of ♀ from ☉ in her Orbite 72389.

Argument of Latitude, which giveth the Inclination of ♀ 2d 32′ 22″ South, the Reduction 2′ 57″, and the Curtation 72 Parts.

99072	Earth from ☉.	
72317	♀ from the ☉ Curt	
Summe 171389		4,233983
Differ. 26755		3,427404
Tang. of 24d 25′ 24″,		9,657162
		13,084566
Tang. of 4 3 18		8,850583
Diff. 20 22 6 Parallax of Orbe.		

Sine of the angle of Elongation 20d 22′ 6″,		9,541646
Sine of the angle of Commutat.	48 50 48;	9,876766
Co-tangent of the Inclination.	2 32 22	11,353100
		21,229866
Co-tangent of the Latitude ♀	1d 10′ 28″:	11,688220

	S D ′ ″
Middle motion of ☿.	2 18 56 25
Aphelion ſubſtract.	8 14 03 18
Anomalie of ☿.	6 04 53 07
Æquation Adde.	02 33 29
Place of ☿ from ☉ in his Orbite.	2 21 29 54
Node Aſcend. ſubſtract.	1 13 34 42
Argument of Latitude.	1 07 55 12
Reduction ſubſtract.	12 07
Place of ☿ from ☉ in the Eclipt.	2 21 17 47
Place of ☉ from the Earth.	11 05 54 45
Anomalie of Commutation.	3 15 23 02
Half ſumme.	52 41 31
Parall. of Orbe adde.	17 52 56
Place of ☿ from the Earth.	11 23 47 41

Diſtance of ☿ from ☉ in his Orbe 30555.

The Inclination 4d 14′ 25″ North, the Reduction 12′ 7″, & the Curtat. 105. therefore the Diſtance Curtat. is 30450

99072	Earth from ☉.	
30450	☿ from ☉.	
Summe 129522,		4,112343
Differ. 68622;		3,836463
Tang. of 52d 41′ 31″,		10,118034
		13,954497
Tang. of 34 48 35,		9,842154
Diff. 17 52 56 Parallax of Orbe.		

Sine of the angle of Elongation 57d 52′ 36″,		9,487225
Sine of the angle of Commutat.	74 36 58;	9,984153
Co-tangent of the Incliuation	4 14 25,	11,129934
		21,114087
Co-tangent of the Latitude of ☿	1 21 9	11,626862

The Difference of Longitude is 2^d 29′ 10″, and the Difference of Latitude 2^d 31′ 37″, and therefore ☿ was diſtant from ♀ 3^d 32′ towards the North Weſt, agreeing to Obſervation.

Anno 1598 *September* 14^d 15^h *P. M. John Kepler* obſerved (at *Grats* in *Stiria)* that the *Lyons Heart* was covered by the morning ſtar *Venus. Kepler Aſtron. Opt. pag.* 305. For the Difference of Meridians, I deduct from the time given 1^h 2′ and the Reſidue 13^h 58′ was the time at *London.*

The Operation.

⊙	S	D	′	″
Middle motion of ⊙.	6	3	35	32
Aphelion of ⊙ ſubſtract.	3	5	41	7
Anomalie of the ⊙.	2	27	54	25
Æquation ſubſtract.		2	2	39
Diſtance of ⊙ from the Earth.	100095			
True place of the Sun.	6	1	32	53

viz. 1^d 32′ 53″ ♎.

	S	D	′	″
Middle motion of ♀.	2	27	34	41
Aphelion ſubſtract.	10	4	21	6
Anomalie of ♀.	4	23	13	35
Æquation Subſtract.			28	41
Place of ♀ from ⊙ in her Orbite.	2	27	6	00
Node Aſcend. ſubſtract.	2	12	58	00
Reſts.	0	14	8	00
Reduction ſubſtract.			1	25
Place of ♀ from ⊙ in the Eclipt.	2	27	4	35
Place of ⊙ from the Earth.	6	1	32	53
Anomalie of Commutation.	8	25	31	42
Complement to the Circle.	3	4	28	18
The half.		47	14	9
Parallax of the Orbe, ſubſtract.	1	7	11	2
True place of ♀ from the Earth.	4	24	21	51

Diſtance of ♀ from ⊙ in her Orbe 71906.

Argument of Latitude: hence the Inclination of ♀ is 0^d 49′ 31″ the Reduction 1′ 25″ and the Curtation 8 parts.

100095. Earth from the ⊙.
71898. ♀ from the ⊙ Curt.

Summe	171993	4,235511
Difference	28197	3,450203
Tangent of	47^d 14′ 9″,	10,033929
		13,484132
Tangent of	10 3 7	9,248621
Dif.	37 11 2	Parallax of the Orbe.

Sine of the Angle of Elong.	37^d 11′ 2″	9,781306
Sine of the Angle of Commutat.	85 31 42	9,998676
Co-tangent of the Inclination	co 49 31	11,841493
		21,840169
Co-tangent of the Latitude ♀	30′ 1″	12,058863

The true Longitude of the Lions Heart at the time of this Animadverſion was ♌ 24^d, 15′ 2″, with Latitude $26\frac{1}{2}$′ North, therefore their Difference of Longitude was $5\frac{3}{4}$′, and their difference of Latitude $3\frac{1}{2}$′. But becauſe it was obſerved in, or neer the Horizon, the ſaid ſtars appeared of a greater magnitude then commonly they ſeem to be of elſwhere, and therefore to the eye, ♀ might ſeem to hide *Cor Leonis*: Beſides, if the Obſervation were taken at their riſing, as is affirmed, the Diſtance of their Centers was not then above 3′, which the Diameter of ♀ exceeded, and therefore muſt needs cover the ſtar, as *Kepler* obſerved.

In ſome of the former Obſervations its left doubtfull whether they were applyed to the middle, or apparent time, therefore have I accommodated the Calculation to the time given, which ſhould have been rectified by the Æquation of Civill Days, and ſo peradventure in ſome of them; there may ariſe a little difference, if duly conſidered, but I have waved ſuch niceties, becauſe that difference can never extend to a minute in any of the Planets, excepting the Moon, which we have æquated, in reſpect of her ſwift motion.

§ 9. *An Eclipſe of the* Moon, *obſerved* May 5, 1650.

ON Sunday the fifth of *May* this preſent yeer 1650, my worthy friend Mr. *Robert Billingſley*, & my ſelf, being together in *Rutland*, we waited to obſerve the Moons Eclipſe, but in reſpect of the interpoſition of Clouds between our ſight and the Moon, we could make no remarkable Obſervation till the End, which by two ſeverall Obſervations, we found to be exactly at 9 houres, and 12 minutes *P. M.*

Calculus hujus Eclipſeos Lunæ.

		D	H	m	s
		S	D	′	″
Middle Oppoſition of the Luminaries.	*May*	5	1	29	57
Intervall of the middle and true Oppoſition.			6	13	23
Middle time of the true Oppoſition.	*May*	5	7	43	20
Æquation of time.	*Adde*			6	47
The apparent time of the true Oppoſition.		5	7	50	7
Anomalie of the Sun Co-æquate.		10	17	2	59
Anomaly of the Moon Co-æquate.		5	9	52	56
True motion of the Moons Latitude from ☊.		6	7	46	43
Ergò, her true Latitude.	*South Deſc.*			40	33
True place of the Sun.		1	24	59	21
True place of the Moon in her Orbite.		7	24	59	21
Reduction.	*Subſtr.*			1	53
True place of the Moon in the Ecliptique.		7	24	57	28
Hourly motion ☉				2	24
☾				37	47
☾ from ☉.				35	23
By which dividing the Reduction, the Quotient in time is	*Adde*			3	11
Therefore the adæquate time of the true ☍ ☉☾.	*May*	5	7	53	18
Semidiameters of the ☾.				16	56
ſhadow.				46	42
Aggregate of their Semidiameters,				63	38
Scruples deficient.				23	5
Digiti ergò Ecliptici 8 10′ 47″.					
Minutes of Incidence.				49	2
Time of Incidence.			1	23	8
Totall Duration.			2	46	16
Diſtance of the true ☍ from the greateſt Obſuration in time.	*Subſtr.*			5	59
Therefore the greateſt Obſcuration.	*May*	5	7	47	19

		H	′	″	
Hence	The beginning	6	24	11	*P. M.*
	The greateſt Obſcuration.	7	47	19	
	The true Oppoſition.	7	53	18	
	The End.	9	10	27	

Being conſentaneous to Obſervation.

§ 10. *Two remarkable Eclipſes of the* Sun, *obſerved by* Clavius, *where of the firſt he beheld at* Conimbria *in* Portugall, *the other at* Rome.

ANno 1560, *Auguſt* 21, about noon, he obſerved at *Conimbria*, (whoſe Longitude is 11d. 45′, Latitude 40d. 15′) that the whole body of the Sun was Eclipſed for ſome pretty ſpace of time, yea, and that in a moſt ſtrange manner, as he teſtifies in the fourth Book of his Comment. upon *Joan. de Sacro Boſco Pag.* 594. *Edit. poſtr.* where his words are: *Circa Meridiem obſervavi Eclipſin Solis, in qua interponebatur Luna directè inter viſum, ac Solem, ita ut totum Solem non modico temporis intervallo contegeret, eſſentq; tenebræ quodammodo majores quam nocturnæ. Neque enim ubi pedem quis poneret, videre poterat, clariſſimèque in Cœlo ſtellæ apparebant (& quod mirabile erat) aves ex aëre in terram præ horrore obſcuritatis decidebant.*

A Calculation of the ſaid Eclipſe.

		D	H	m	s
		S	D	′	″
Middle Conjunction ☉☾ at *London* 1560.	*Auguſt*	20	20	53	38
The Intervall to be added.			3	36	35
Middle time of the true Conjunction at *London.*	*Auguſt*	21	0	30	13
Æquation of time.	*Subſtract.*			3	9
Apparent time of the true Conjunction at *London.*	*Aug.*	21	0	27	4
Anomaly of the ☉ Coæquate.		2	3	37	41
Anomaly of the ☽ Coæquate.		4	13	6	11
The true place of the Sun.		5	7	45	51
The true place of the Moon in her Orbite.		5	7	45	51
Anomaly of the Moons Latitude.		5	25	31	1
Reduction.	*Aade*			1	6
Place of the ☾ in the Ecliptique.		5	7	46	57
Hourely motion ☉				2	26
☾				36	27
☾ from ☉				34	1
By which dividing the Reduction, the Quotient in time is.	*Subſtr.*			1	56
The exact time of the true ☌ at *London.*	*Aug.*	21	0	25	8
Difference of the Meridians of *London* and *Conimbria.*	*Subſtract.*			37	0
The exact time of the true ☌ at *Conimbria*	*Aug.*	20	23	48	8
The Difference between the true and viſible ☌.				35	2
The time of the viſible ☌ at *Conimbria.*	*Aug.*	20	23	13	6
The Latitude of the Moon.	*North.*			25	18
The Parallaxis of Latitude of Sun from Moon.	*South.*			25	20
The apparent Latitude of Sun from Moon,	*South,*				2
Semidiameter of the Sun.				16	19
Semidiameter of the Moon.				16	43
The Summe of the Semidiameters.				33	2
The part deficient.				33	0
The Digits Eclipſed.	*Dig.*		12	8	5

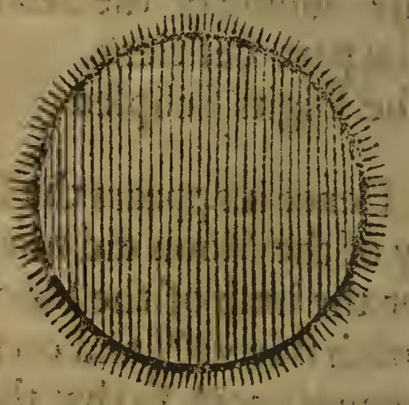
Hence it appears the Eclipſe was totall, and that the body of the Moon did more then cover the body of the Sun, for the limb of the Moon exceeded the Suns limb on the South ſide 26″, and on the North ſide 22″ as the Figure demonſtrates, ſo that the Calculation agrees exactly with the Obſervation of *Clavius.*

The other centrall Eclipſe of the Sun which *Clavius* mentions, befell at *Rome* 1567. *Aprill* 9^{d}. about noone, where *Clavius* obſerved the whole body of the Moon to be conteined within the compaſſe of the Sun, inſomuch that there appeared a bright ſhining Circle round about the Moon, as his words in the fore-mention'd place will beſt teſtifie: *Alteram* ☉ *Eclipſin Romæ anno* 1567. *Apr. 9. circa etiam meridiem conſpexi, in qua rurſus Luna, etſi inter viſum ac Solem interiiciebatur, non totum tamen Solem obſcurabat, ut in priori, ſed relinquebatur in Sole circulus quidam exilis undique totam Lunam ambiens. Clavius* pag. 594. in Sphær. *Jo. de Sacro Boſco.*

A Calculation of the ſaid Eclipſe.

		D S	H D	m ′	s ″
Middle Conjunction ☉ ☾ at *London* 1567.	*Aprill*	8	9	6	18
The Intervall to be added.			13	29	3
Middle time of the true Conjunction at *London*.	*Aprill*	8	22	35	21
Æquation of dayes to be added.	*Adde*			4	23
Apparent time of the true Conjunction at *London*.	*Aprill*	8	22	39	44
Anomaly of the ☉ Coæquate.		9	22	33	36
Anomaly of the ☾ Coæquate.		3	4	43	1
The true place of the Sun.		♈	28	38	7
The true place of the Moon in her Orbite.		♈	28	38	7
Anomaly of the Moons Latitude.		5	24	38	27
Reduction.	*Adde*			1	18
Place of the ☾ in the Ecliptique.		♈	28	39	25
Hourely motion ☉				2	26
Hourely motion ☾				33	54
Hourely motion ☾ from ☉				31	28
By which dividing the Reduction, the Quotient in time is.	*Subſtr.*			2	29
The exact time of the true ☌ at *London*.	*Aprill*	8	22	37	15
Difference of the Meridians of *London* and *Rome* adde.			1	6	00
Exact time of the true ☌ at *Rome*.	*Aprill*	8	23	43	15
The Difference between the true and viſible ☌.	*Adde*			21	31
The time of the viſible ☌ at *Rome*.	*Aprill*	9		4	46
The Semidiameter of ☉				16	20
The Semidiameter of ☾				16	16
The Summe of the Semidiameters.				32	36
The Latitude of the ☾ ſeen.	*North*			00	1
The parts deficient.				32	35
Ergò, The Digits Eclipſed.	*Dig.*	11		58	9

By this *Paradigma*, it appeares that the whole body of the Moon was comprehended within the compaſſe of the Sun, and that there appeared a bright ſhining circle round about the Moon, as *Clavius* obſerved, and as this figure demonſtrateth.



To

§ 11.

TO ſupply a vacant page, I ſhall here inſert a generall Rule, whereby to preſage the Colours of the Eclipſe of the Sun and Moon, according to that Doctrine delivered to us by *Alphonſus* and his followers.

A Table ſhewing the colour of the Moons *Eclipſe.*

The firſt part of the Table.

Minutes of the true Latitude of the Moon.	
0 2 4 6 8	Moſt Black.
10 12 14 16 18 20	Black mixed with ſome Greenneſſe.
22 24 26 28 30	Black with Redneſſe.
32 34 36 38 40	Black with Paleneſſe.
42 44 46 48 50	A Pale Aſh-colour.
52 54 56 58 60	A White Aſh-colour.

The ſecond part of the Table.

Signes and Degrees of the Moons Anomaly.			Signes and Degrees of the Moons Anomaly.	
S	D		S	D
0 0	0 10	A Reddiſh colour.	12 11	0 20
0 1 1	20 0 10	A White Aſh-colour.	11 11 10	10 0 20
1 2 2	20 0 10	An Aſh-colour.	10 10 9	10 0 20
2 3 3	20 0 10	A Pale Black.	9 9 8	10 0 20
3 4 4	20 0 10	Black mixed with Redneſſe.	8 8 7	10 0 20
4 5 5	20 0 10	Black mixed with greenneſſe.	7 7 6	10 0 20
5 6	20 0	Pitchy Black.	6 6	10 0

A Table ſhewing the Colour of the Suns *Eclipſe.*

Diſtance of the Sun from ☊ or ☋. Degree	
1	Exceeding black.
2	Myſty black.
3	A Brown black.
4	A Brown mixed with Yellow.
5	A lightſome brown.
6	A reddiſh brown.
7	Reddiſh and Yellow.
8	Reddiſh and Yellow.
9	A grey ruddiſh colour.
10	A ruſſet grey.
11	Yellow.
12	A white Yellow.

Enter the Table of the Colour of the ☾ Eclipſe, finding the ☾ Latitude in the firſt part, and her Anomalie in the ſecond part, and the colours there found being mixed together, (as Painters uſe to do) will ſhew the true colour thereof; But in the latter, enter with the diſtance of ☉ from ☊, and the colour thereof will appear.

§ 12. *Obſervations of the* Planets *places made by* Tycho Brahe, Longomontanus, *and other the moſt approved Writers:* *the time of each* Obſervation *being reduced to the* Meridian *of* London.

Obſervations of Saturn.

Time given, Old-ſtyle.

Year	*Moneths*	D	H	′	*Place ♄ obſer.*			*Latitude obſerved.*
1582	Auguſt	21	1	10	♓	7	26	in ☍ ☉
1583	September	3	0	10	♓	19	50	in ☍ ☉
1584	September	15	5	49	♈	2	34	in ☍ ☉
1585	September	28	18	40	♈	15	39	in ☍ ☉
1586	October	12	10	10	♈	29	2	in ☍ ☉
1587	October	26	8	10	♉	12	46	in ☍ ☉
1588	November	8	9	20	♉	26	44	in ☍ ☉
1589	November	22	13	40	♊	10	53	in ☍ ☉
1590	February	8	7	10	♊	7	32	Latitude 1^d 30′ South.
1590	September	7	11	10	♊	28	6	Latitude 1 11 South.
1590	December	6	19	40	♊	25	10	in ☍ ☉
1587	January	9	9	0	♈	26	8	Latitude 2^d 28′ South.
1590	December	21	0	10	♋	9	24½	in ☍ ☉
1591	December	9	12	0	♋	10	21	Latitude 0^d 33′ South.
1592	January	8	9	10	♋	23	8	Latitude 0 8½ North.
1594	December	10	7	0	♌	24	30½	Latitude 1 18½ North.
1595	January	30	20	10	♌	21	15½	Latitude 2 37 North.
1600	January	25	15	44	♎	28	31½	Latitude 2 39 North.
1600	February	11	15	10	♎	28	19	Latitude 2 43 North.
1608	July	9	2	10	♑	26	53	in ☍ ☉
1609	July	21	12	10	♒	8	31	in ☍ ☉
1610	Auguſt	2	21	40	♒	20	10	in ☍ ☉
1611	Auguſt	15	15	10	♓	2	12	in ☍ ☉
1639	September	6	8	10	♒	12	37	
1640	October	2	8	10	♒	23	56½	
1641	Auguſt	19	10	18	♓	9	34⅓	

Obſervations of Jupiter.

Years	*Moneths*	D	H	′	*Place obſerved*			*Latitude obſerved*
1583	September	6	19	20	♓	23	33	in ☍ ☉
1584	October	13	6	30	♉	0	22	in ☍ ☉
1585	September	12	5	20	♓	28	56	
1587	January	14	8	10	♋	7	19	Latitude 0^d 8′ North.
1588	October	16	18	10	☌	♃	♂	♂ Elevated above ♃ about the Diameter ☾.
1589	January	29	12	33	♍	15	43	Latit. ♃ 1^d 28′ North.
1596	October	18	11	10	♉	5	40	in ☍ ☉
1600	March	5	9	10	♌	12	33⅓	Latitude 1^d 7′ North.
1598	December	28	11	0	♋	14	46	Latitude 0 13 North.
1607	September	17	10	20	♈	4	10	in ☍ ☉
1610	December	30	13	50	♋	19	36	in ☍ ☉
1613	March	1	21	10	♍	21	45	in ☍ ☉
1594	Auguſt	6	8	23	♒	22	15½	in ☍ ☉

Obſerva-

Obſervations of Mars.

Year	*Moneths*	D	H	′	*Place obſerved*			*Latitude obſerved.*
1580	November	18	0	41	♊	6	28½	in ☍ ☉
1582	December	28	3	8	♋	16	55½	in ☍ ☉
1585	January	30	18	24	♌	21	36⅙	in ☍ ☉
1587	March	6	6	33	♍	25	43	in ☍ ☉
1589	Aprill	14	5	33	♏	4	23	in ☍ ☉
1591	May	13	13	0	♑	2	20	
1591	June	8	6	53	♐	26	43	in ☍ ☉
1585	May	10	17	20	♌	26	54½	
1586	December	31	18	18	♎	1	4½	Latitude 2ᵈ 54′
1589	November	1	5	20	♑	20	59¼	Latitude 1 36 South.
1591	September	26	6	20	♑	18	36	Latitude 1 36 South.
1593	Auguſt	25	16	37	♓	12	16	in ☍ ☉
1595	October	30	13	49	♉	17	31½	in ☍ ☉
1597	December	13	15	4	♋	2	28	in ☍ ☉
1600	January	18	13	12	♌	8	38	in ☍ ☉
1600	March	6	7	43	♋	29	18	Latitude 3ᵈ 22′ North
1585	March	12	9	40	♌	11	46	Latitude 3 22 North.
1586	December	15	17	40	♍	26	6½	Latitude 2 35 North.
1602	February	20	13	23	♏	12	27	in ☍ ☉
1582	November	23	15	10	♋	26	38½	Latitude 2 49′ North.
1583	January	26	5	25	♋	8	20⅑	Latitude 3 52 North.
1589	March	8	15	34	♏	12	17	Latitude 2 4 North.
1587	January	25	16	10	♎	4	42	Latitude 3 26 North

Obſervations of Venus.

Years	*Moneths*	D	H	′	*Place obſerv.*			*Latitude obſerved*
1587	March	2	16	40	♓	10	7	
1585	September	14	16	25	♌	15	55	Latitude 2 8 North.
1588	December	14	18	50	♏	17	10	Latitude 3 10 North.
1590	December	17	19	10	♐	20	0	Latitude 0 27 North.
1592	February	17	16	40	♑	22	23	Latitude 2 56 North.
1594	December	17	4	10	♒	22	58	Latitude 1 6½ South.
1600	February	21	17	50	♑	16	26	Latitude 3 20 North.
1601	May	9	7	27	♋	4	19	Latitude 3 9 North.
1610	December	12	3	50	♒	17	58	Latitude 1 29 South.
1633	May	16	9	0	♋	18	17	Latitude 2 48 North.
1585	November	14	18	10	♏	13	4	Latitude 2 18 North.
1585	November	23	18	30	♏	25	3	Latitude 1 25 North.
1587	January	9	4	0	♒	17	42	Latitude 0 2 North.
1590	March	6	6	8	♈	13	44	Latitude 1 42 North.
1592	February	3	4	58	♓	12	20	Latitude 0 47 North.
1593	May	11	8	48		23	16	Latitude 2 0 North.
1586	October	24	18	20	♎	22	35	
1634	January	2	6	28	♒	1	31	*Stylo novo* Latit. 0ᵈ 57′ Sonth.
1635	January	12	17	40	♑	8	22	Latitude 1 39 North.
1607	Aprill	15	8	10	♉	21	5	Latitude 1 40 North.

Obſervations of the Moon.

Years	*Moneths*	D	H	′	*Place obſerved*			*Latitude obſerved*
1587	January	9	6	10	♊	1	0½	4 29 15 South
1587	January	14	12	49	♌	10	40	5 3 57 South
1587	Auguſt	4	8	23	♍	7	51	4 15 30 North
1590	December	28	9	31	♊	24	32	3 14 0 South
1591	Auguſt	23	8	15	♓	0	43	4 39 34 South
1591	December	20	13	24	♌	4	56	2 0 39 North
1592	May	7	8	30	♌	21	52⅓	3 31 26 North
1594	December	21	5	10	♌	29	38½	3 59 20 North
1600	Aprill	10	6	42	♌	6	21	1 33 40 South. *And this was*
1641	June	10	9	48	♏	28	11⅔	*the laſt Obſervation of that Tres-noble*
1639	March	28	9	6	♊	7	39	Tycho Brahe.
1641	June	14	11	3	♑	29	33	4 58 49 North.

§ 13 *Obſervations of Eclipſes of the* Moon.

ANno 1462, the 11^{d} of *June*, the Moon was Eclipſed, whoſe middle *Regiomontanus* obſerved at *Viterb* in *Italy*, 14^{h} 48′ *P. M.* when ſhe was darkened 7 Dig. on her North ſide, *Regiomont. in Torqueto.*

Anno 1500 *November* 5. was an Eclipſe of the Moon, whoſe middle was obſerved at *Rome* by *Copernicus* at 14^{h} 0′ *P. M.* being then 10 Digits Eclipſed.

Anno 1511, *October* 6^{d} the Moon was Eclipſed totally, whoſe beginning *Copernicus* obſerved at *Fruenburg* in *Pruſſia*, at 10^{h} 52′ *P. M.*

Anno 1522. *September* 5^{d} happened an Eclipſe of the Moon, the beginning whereof *Copernicus* obſerved at *Fruenburg* in *Pruſſia*, at 11^{h} 36′, and this was totall, ſee *Cop. Lib.* 4. *Cap.* 5. *Revolut.*

Anno 1560, the 11 of *March* was a Partile Eclipſe of the Moon, whoſe beginning *Cornelius Gemma* obſerved at *Lovane* at 15^{h} 40′.

Anno 1580, *January* 31^{d} happened a Full-Moon Eclipſe, whoſe middle Noble *Tycho* obſerved at *Uraniburg* in *Denmark*, at 10^{h} 9′ *P. M.* ſhe being then all darkned.

Anno 1588, the 2d of *March* hapned a totall Obſcuration of the Moon, the middle whereof was at *Uraniburge* 15^{h} 8′ *P. M.*

Anno 1591, *July* 7^{d}. *Michael Mæſtlin* obſerved an Eclipſe of the Moon at *Tubing*, and when the Center of the Sun was appearing above the Horizon, he ſaw the Moon two degrees high, Eclipſed on her South ſide, and contrariwiſe, when the Moon ſet in the Weſt, (which was a little before the middle of the Eclipſe) he obſerved the Sun elevated above the Horizon two degrees.

Anno 1601, *November* 29^{d}, was an Eclipſe of the Moon, whoſe middle *Lansberg* obſerved at *Ter-Gooſe* in *Zeland*, at 6^{h} 12′ *P. M.* at which inſtant, ſhe was Eclipſed above 10 Dig. on the South ſide.

Anno 1609, *January* 9^{d}, was an Eclipſe of the Moon, whoſe beginning *Lansberg* obſerved at *Ter-Gooſe*, in *Zeland*, at 1^{h} and 5′ after midnight, and the end about 3^{h} and a quarter after midnight, being Eclipſed at the middle thereof about 9 Digits on the North ſide.

Anno 1622, *February* 19^{d}, at 9^{h} 45′ *P. M.* was the middle of a Lunar Eclipſe at *Rome*.

Anno 1628, *January* 10^{d}, Dr. *Bainbridg* (at *Oxford*) obſerved an Eclipſe of the Moon, the beginding at 7^{h} 31′, the beginning of totall darkneſſe at 8^{h} 23′, the end of totall darkneſſe at 10^{h} 0′ 30″, and the end at 10^{h} 57′ 30″.

§ 14 *Obſervations of Eclipſes of the* Sun.

ANno 1560, *Auguſt* 11, about noon, *Clavius* obſerved the Sun for ſome ſpace of time to be totally Eclipſed, inſomuch that the darkneſſe was ſo great at *Conimbria* in *Luſitania*, (where he ſo obſerved it) that the ſtars at mid-day appeared bright and ſhining, and the people durſt not ſtir abroad, yea, and that which was moſt wonderfull, was the falling of the Birds at the horrour of the Obſcuration: ſee *Clavius Pag.* 594 *in Sphær. Joan. de Sacro Boſco.*

Anno 1567, the 9^{d} of *Aprill*, *Chriſtopher Clavius* again obſerved a Centrall Eclipſe of the Sun at *Rome* about noon, but in this Eclipſe the Moon did not cover the whole body of the Sun, as in the other Eclipſe 1560, but there appeared a bright ſhining Circle round about the Moon: ſee *Clavius in loco prædicto.* This Eclipſe *Tycho* obſerved at *Uraniburg* about noon, and but 6^{d} 29′ darkned on the South ſide: The Calculations of theſe two ſolar Eclipſes are before inſerted.

Cornelius Gemma at *Lovan*, under the Latitude of 50^{d} 50′, and Longitude of 26$\frac{1}{2}$ degrees, obſerved the beginning of this Eclipſe at 10^{h} 12′ *A. M.* and the Quantity obſcured 9 Dig. on the South ſide.

Anno 1598, the 25^{d} of *February* before noon, Dr. *Jeſſenius* obſerved at *Torge* in *Miſnia*, (*viz.* under the Latitude of 51^{d} 33′, and Longitude of 35^{d}) an Eclipſe of the Sun almoſt centrall, for all the Moon was ſeen within the compaſſe of the Sun, ſo that there appeared a bright ſhining Circle round about the Moon: *Kepler Aſtron. Opt. Pag.* 299 & 419.

Anno 1601 was an Eclipſe of the Sun, *December* 14, the middle whereof was obſerved by *Kepler* at *Prague* in *Bohemia*, about 2 a clock, and 3′ *P. M.* at which inſtant the Sun was Eclipſed full 8 dig. *Kepler Aſtron. Opt. Pag.* 433.

This Eclipſe was alſo obſerved by the Fiſher-men upon the ſea ſhore, neer *Burgen* in *Norway*, under the Latitude of 60^d 30′, and Longitude of 27^d and a half, where they with great admiration ſaw the whole body of the Moon to be conteined within the Sun, ſo that there did appear a bright Circle round about the Moon, about a digit and a half, ſee the ſecond part of *Aſtronomia Danica. Pag.* 165.

Anno 1605, *October* 2^d was an Eclipſe of the Sun, whoſe middle was obſerved at *Middleburg* by *John Rotarius*, about a quarter of an hour paſt one a clock in the afternoon, at which time the Sun was obſcured above 10 Digits, and leſſe then 11 Digits.

This Eclipſe was alſo obſerved at *Naples* in *Italy*, where the whole Sun was covered by the dark body of the Moon, which then interpoſed: *Kepler Epit. Aſtron. Copernic. Pag.* 893.

Anno 1608, was an Eclipſe of the Sun, whoſe middle was obſerved by *Lanſberg*, at *Ter-Gooſe*, 5′ paſt 4 *P. M.* at which time the Sun was Eclipſed on his South ſide two Digits and a half: *Lansberg in Theſauro Obſervat. Aſtron. Fol.* 120.

This Eclipſe was alſo obſerved by that famous Aſtronomer *C. Longomontanus*, at *Haphnia* in *Denmark*, but the Ayr being there thick, and but very little Eclipſed, it was ſcarce diſcernable.

Anno 1621 hapned an Eclipſe of the Sun, the beginning thereof *Lansberg* obſerved at *Middleburg*, about 7 in the morning, and the end at 36′ paſt 9, the parts darkned at the middle thereof being $10\frac{1}{3}$.

Anno 1630, *May* 31^d hapned an Eclipſe of the Sun, whoſe beginning I obſerved at *North-Luffenham*, neer 6 *P. M.* and was Eclipſed about 11 Dig. at the middle thereof, but being then in my tender years, I could make no acurate Obſervation.

But my worthy Countriman Dr. *Bainbridge* then at *Oxford*, obſerved the beginning thereof to be exactly at 5^h 58′, and the end at 7^h 48′.

The ſame Eclipſe *Gaſſendus* obſerved at *Paris* in *France*, where he obſerved the beginning at 6^h 16′, and the end at 7^h 12′, and in the middle he found the Digits Eclipſed to be 11 and 32′.

Anno 1639, *May* 22^d, the Sun was Eclipſed, the end whereof was obſerved at *Leyden* in *Holland* at 6. 28′.

Anno 1645, *May* 11, I obſerved an Eclipſe of the Sun neer 11 before noon, above five points darkned, but being then imployed in the publique affairs of the Kingdome, I wanted oportunity to make further Obſervation thereof.

Anno 1649, *October* 25^d. hapned an Eclipſe of the Sun, whoſe middle I obſerved at *North-Luffenham*, about three quarters of an hour paſt one a clock after noon, and the end moſt exactly at two a clock and 34′. The quantity Eclipſed at the middle thereof being $4\frac{3}{4}$ Dig.

This Eclipſe was moſt exactly obſerved at *London*, by my kind friend Mr. *William Leybourn*, the beginning there (by Obſervation) was at 12^h 49′ 28″, and the end at 2^h 36′ 8″, for at the beginning, the Altitude of the Sun was 22^d 0′, and at the end 14^d 45′: The Digits Eclipſed in the middle was $4\frac{1}{2}^d$.

The ſame year 1649, upon the 31^d of *May*, was a very ſmall Eclipſe of the Sun, which was obſerved at *S. Johns* Colledg, by my worthy and learned friend Mr. *Robert Billingſley* Mathematician, the middle was at 5^h 30′, and the Quantity obſcured $0\frac{3}{4}$ of a Digit.

An

An Advertiſement to the READER.

That moſt admirable Mathematician John Kepler, *by the help of* Tycho's *Obſervations, did make the moſt abſolute and beſt reſtauration of* Aſtronomy, *of any that ever did precede him, having not onely framed new* Tables of the Æquations of the Planets, *but alſo endevoured by the aſsiſtance of ancient ſelect* Obſervations, *by comparing them with* Tycho's, *to rectifie and eſtabliſh their middle* Motions, *yet, nevertheleſs, ſince his time hath* Bullialdus *(by the help of other* Obſervations) *attempted to reform what his learned Predeceſſor had done, he comparing and limiting their middle* Motions *chiefly, by the aſsiſtance of ſome* Obſervations *hee found* in Lib. M. C. Bibliothecæ Regis Chriſtian. *but becauſe it ſo manifeſtly appears to every judicious eye, that the moſt of thoſe* Animadverſions *of* Ptolomy *and the Ancients, were fallacious and uncertain; they ſeldome ayming neerer then a degree (and I am certain ſometime more) in the places of the* Planets, *I ſhall not therefore much diſſent from what that worthy* Kepler *hath done, till time and obſervation further confirme the truth thereof, notwithſtanding, I have uſed all the diligence I could poſſibly, to eſtabliſh the ſame upon ſuch* Obſervations *as have been made in theſe 200 yeers, there being more likelyhood of truth in them, then in thoſe of ancient time, when* Urania *had few Favourites, however I muſt acknowledg the intervall of time is but ſmall, and durſt I confide in thoſe more ancient, I might undertake to rectifie the ſame for many thouſand yeers ſucceeding. What I have done, I dare aver ſhall not vary ſenſibly, (if any thing at all) from the truth of obſervation in many ſucceeding Centenaries; yet I will not ſay, but that they who live ſome Generations after our time, may have opportunity to make corrections, by comparing their* Obſervations *with thoſe of* Tycho, *and with others that have been made exactly in our times. But as for the* Tables of the Æquations of the Planets, *I verily believe that* Poſterity *ſhall not vary much from what I have done, being aſſured they agree to the truth of Obſervation. And here the judicious Reader is deſired to take notice; that the middle* Motions *ſet down in my* Tables, *is applyed to the* Meridian *of* London *(as is declared in the firſt Chapter) therefore, if their* Places, *or* Aſpects *be to be reduced to any other* Meridian, *he muſt firſt ſeek the true Site of his place in reſpect of* London; *elſe peradventure may he come to dream of an errour in the* Tables *when none is; for the Longitude of places being not yet thoroughly rectified, we cannot attein the difference of* Meridians *ſo exactly as wiſhed. The Catalogue I have inſerted is taken out of the moſt approved Writers, who have written of* Geographie, *yet is there to this day no ſmall difference amongſt the moſt notable* Mathematicians, *whoſe Works are extant, neither can I reconcile the beſt to agree with truth. If for inſtance, we do but ſeek to finde the difference of the* Meridians *of* London *and* Rome *(two eminent Cities) we ſhall finde their difference of* Meridians *by obſervation of* Lunar Eclipſes *to be exactly one houre 6 minutes, wherewith* Clavius *agrees, whereas* Maginus *makes it one houre 26 minutes.* Apian *and* Leovitius *one houre 33 minutes.* Lansberge *one houre three minutes.* Argol 57 *minutes.* Kepler *and* Eichſtade 50 *minutes; and* Bullialdus *no more then 48 minutes. I have examin'd divers other Cities of note in* Europe, *and compared them with the ſaid Authors, amongſt whom I find no ſmall diſcrepancie, and ſome I have rectified by obſervation of* Lunar Eclipſes, *and would my narrow limits of time have permitted, I ſhould have endeavoured a reſtitution in all thoſe places, wherein Cœleſtial Obſervations have been made. Shortly, if occaſion ſerve, thou mayſt expect it, in the interim I deſire the* Reader *to be cautious, in the premiſes.*

A Table of converting Houres and Minutes, into Degrees and Minutes, of the ÆQUATOR.

Houres.	Degrees of the Æquator.
1	15
2	30
3	45
4	60
5	75
6	90
7	105
8	120
9	135
10	150
11	165
12	180
13	195
14	210
15	225
16	240
17	255
18	270
19	285
20	300
21	315
22	330
23	345
24	360

Minutes.	Degrees & Minutes of the Æquator. D	
1	0	15
2	0	30
3	0	45
4	1	0
5	1	15
6	1	30
7	1	45
8	2	0
9	2	15
10	2	30
11	2	45
12	3	0
13	3	15
14	3	30
15	3	45
16	4	0
17	4	15
18	4	30
19	4	45
20	5	0
21	5	15
22	5	30
23	5	45
24	6	0
25	6	15
26	6	30
27	6	45
28	7	0
29	7	15
30	7	30

Minutes.	Degrees & Minutes of the Æquator. D	
31	7	45
32	8	0
33	8	15
34	8	30
35	8	45
36	9	0
37	9	15
38	9	30
39	9	45
40	10	0
41	10	15
42	10	30
43	10	45
44	11	0
45	11	15
46	11	30
47	11	45
48	12	0
49	12	15
50	12	30
51	12	45
52	13	0
53	13	15
54	13	30
55	13	45
56	14	0
57	14	15
58	14	30
59	14	45
60	15	0

A Canon or Table of Converting Houres and Minutes of an Hour, into Minutes of the Day.

H	D	'	''	H	D	'	''
'	'	''	'''	'	'	''	'''
''	''	'''	''''	''	''	'''	''''
1	0	2	30	31	1	17	30
2	0	5	0	32	1	20	0
3	0	7	30	33	1	22	30
4	0	10	0	34	1	25	0
5	0	12	30	35	1	27	30
6	0	15	0	36	1	30	0
7	0	17	30	37	1	32	30
8	0	20	0	38	1	35	0
9	0	22	30	39	1	37	30
10	0	25	0	40	1	40	0
11	0	27	30	41	1	42	30
12	0	30	0	42	1	45	0
13	0	32	30	43	1	47	30
14	0	35	0	44	1	50	0
15	0	37	30	45	1	52	30
16	0	40	0	46	1	55	0
17	0	42	30	47	1	57	30
18	0	45	0	48	2	0	0
19	0	47	30	49	2	2	30
20	0	50	0	50	2	5	0
21	0	52	30	51	2	7	30
22	0	55	0	52	2	10	0
23	0	57	30	53	2	12	30
24	1	0	0	54	2	15	0
25	1	2	30	55	2	17	30
26	1	5	0	56	2	20	0
27	1	7	30	57	2	22	30
28	1	10	0	58	2	25	0
29	1	12	30	59	2	27	30
30	1	15	0	60	2	30	0

A Canon or Table of Converting Minutes of the Day, into Houres, and minutes of an Houre.

H	D	'	''	H	D	'	''
'	'	''	'''	'	'	''	'''
''	''	'''	''''	''	''	'''	''''
1	0	24	0	31	12	24	0
2	0	48	0	32	12	48	0
3	1	12	0	33	13	12	0
4	1	36	0	34	13	36	0
5	2	0	0	35	14	0	0
6	2	24	0	36	14	24	0
7	2	48	0	37	14	48	0
8	3	12	0	38	15	12	0
9	3	36	0	39	15	36	0
10	4	0	0	40	16	0	0
11	4	24	0	41	16	24	0
12	4	48	0	42	16	48	0
13	5	12	0	43	17	12	0
14	5	36	0	44	17	36	0
15	6	0	0	45	18	0	0
16	6	24	0	46	18	24	0
17	6	48	0	47	18	48	0
18	7	12	0	48	19	12	0
19	7	36	0	49	19	36	0
20	8	0	0	50	20	0	0
21	8	24	0	51	20	24	0
22	8	48	0	52	20	48	0
23	9	12	0	53	21	12	0
24	9	36	0	54	21	36	0
25	10	0	0	55	22	0	0
26	10	24	0	56	22	24	0
27	10	48	0	57	22	48	0
28	11	12	0	58	23	12	0
29	11	36	0	59	23	36	0
30	12	0	0	60	24	0	0

A Catalogue of ſome of the chiefeſt Cities in the World,

Shewing the temporarie Difference of their Meridians from London, *with the height of the Pole in each Place. Collected out of the beſt Geographicall Tables now extant, and compared with the Obſervations of* Longomontanus, Kepler, Eichſtade, Bullialdus, *and other the moſt approved Authors.*

Names of the Cities.	*Diff. of Merid.* H m	*Heig. Pole.* D m
Aberden in Scotland.	0 9 S	58 40
Belgrade in Hungarie.	1 24 A	45 16
Alexandria in Ægypt.	2 36 A	30 58
Amberg.	0 48 A	49 32
Amſterdam in Holland.	0 21 A	52 24
Antwerp in Brabant.	0 18 A	51 12
Aquiſgrane.	0 26 A	50 48
Arim, of the Arabian Aſtrologer cal'd the middle of the World.	5 37 A	00 00
Athens in Greece.	1 51 A	37 42
Augſpurg in Swethland.	0 46 A	48 22
Orleans in France.	0 00	48 8
Bamberge.	0 43 A	49 57
Babylon in Caldea.	3 40 A	35 0
Barcino in Catalonia.	0 10 A	40 45
Bethelem.	2 46 A	31 50
Breme in Saxony.	0 34 A	53 8
Bruxles in Brabant.	0 16 A	50 48
Brunſwick in Saxony.	0 41 A	52 16
Burdeaux in France.	0 12 S	45 47
Calice in France.	0 00	50 52
Calicute in Eaſt India.	5 50 A	11 30
Carthage in Affrick.	0 40 A	34 50
Caſſels in Heſſia.	0 36 A	51 19
Compoſtella in Spain.	0 38 S	43 0
Conſtantinople.	2 18 A	43 0
Conimbria in Luſitania.	0 37 S	40 15
Cracovia in Poland.	1 21 A	49 58
Damaſcus in Syria.	3 16 A	34 0
Dantzick.	1 18 A	54 23
Edenburg in Scotland.	0 11 S	57 6
Epheſus	2 17 A	38 18
Ferraria in Italy.	0 43 A	44 45
Feſſe in Mauritania.	0 16 S	33 15
Francford upon Odar.	1 00 A	52 20
Francford upon Mœne.	0 32 A	50 7
Fruenburg in Pruſſia.	1 20 A	54 29
Gadiz, or Cadiz.	0 24 S	36 10
Geneva.	0 26 A	45 54
Gaunt in Flanders.	0 16 A	50 54
Goa in India.	5 48 A	16 0
Ter-Gooſe in Zeland.	0 16 A	51 30
Hamburg in Holſatia.	0 39 A	33 43
Heidelburge.	0 35 A	49 36
Hieruſalem.	3 5 A	32 10
Ingolſtade.	0 47 A	48 42
Lisborne in Portugall.	0 36 S	38 45
Lyons in France.	0 20 A	45 16
Leydon.	0 19 A	32 10
LONDON.	0 00	51 32
Lubeck in Saxony.	0 40 A	53 58
Magdeburg in Saxony.	0 47 A	52 16

Names of the Cities.	*Diff. of Merid.* H m	*Heigh. of Pole* D m
St. Malo.	0 20 S	48 44
Mexico.	6 50 S	20 6
Macao in the Kingdome of (Pegu.	7 9 A	19 30
Malico in Eaſt India.	7 19 A	2 24
Maliapur, the Sepul. of St. (Thomas.	6 13 A	13 0
Moroco.	0 31 S	31 15
Marpurg in Heſſia.	0 33 A	50 43
Mecha in Arabia.	3 23 A	23 0
Meſſane in Sicilia.	1 6 A	37 52
Middleburg in Zeland.	0 16 A	51 30
Coningsburge, Mons regius (Pr.	1 28 A	55 8
Mentz in Germany	0 45 A	
Munſter in Weſtphalia.	0 28 A	51 54
Madrid, ſeat of K. of Spain.	0 11 S	40 45
Mount Sinai.	2 40 A	30 0
Narbon in France.	0 1 A	43 26
Naſſaw.	0 42 A	50 16
Ninive in Aſſyria.	3 38 A	35 50
Naples in Italy.	1 1 A	40 42
Norimberge in Germany.	0 46 A	49 26
Presburg in Hungary.	1 9 A	48 25
Paris in France.	0 2 A	48 51
Prague in Bohemia.	0 56 A	50 56
Padua.	0 49 A	36 25
Pergamus.	2 10 A	41 8
Quinzoy.	11 28 A	37 40
Rome in Italy.	0 50 A	42 2
Ravensburge in Bavaria.	0 41 A	47 45
Roterdam in Holland.	0 14 A	51 55
Rochell.	0 4 S	45 49
Roan in Normandy.	0 6 A	49 30
Salisburge in Bavaria.	0 54 A	47 42
Spier upon the Rhene.	0 35 A	49 24
Stetine in Germany.	0 58 A	53 36
Smyrna in Aſia.	2 14 A	38 50
Stockholm in Swethland.	1 1 A	58 50
Syracuſa in Sicilie.	1 5 A	36 50
Theſſalonica.	1 45 A	41 32
Tripolis in Syria.	3 0 A	34 50
Tubing Wittenburge.	0 38 A	48 34
Trier.	0 26 A	49 50
Torge in Miſnia.	0 53 A	51 33
Copenhage in Denmark.	0 50 A	55 43
Valence in Spain.	0 4 A	39 30
Venice.	0 48 A	45 15
Vienna in Auſtria.	1 5 A	48 22
Weymar.	0 46 A	51 8
Ulme in Lower Swethland.	0 42 A	48 24
Uraniburge the ſeat of Aſtrō:	0 50 A	55 54
Uliſſippo in Portugall.	0 35 S	38 45
Worms.	0 29 A	50 25
Wittenburg in Saxony.	0 52 A	51 52

A Catalogue of ſome of the moſt eminent Cities and Towns in England *and* Ireland, *wherein is ſhewed the Difference of their Meridians from* London, *with the height of the Pole Artique. Many whereof are ſet down according to the Authors own Obſervation, the reſt by their Bearing and Diſtance, &c.*

Names of the Cities.	Differ of Meridiãs		Height of Pole		*Names of the Cities.*	Differ. of Mer		Heig. Pole.	
	H	m	D	m		H	m	D	m
S. Albons.	0	1 s	51	55	Lincolne.	0	01 s	53	15
Barwick.	0	6 s	55	49	Middle of the Iſle of Man.	0	17 s	54	22
Bedford.	0	2 s	52	18	Nottingham.	0	04 s	53	03
Briſtol.	0	11 s	51	32	Newarke.	0	03 s	53	02
Boſton.	0	0	53	2	Newcaſtle.	0	06 s	54	58
Cambridge.	0	1 a	52	17	N.Luffingham, *ſedes Author.*	0	03 s	52	41
Canterbury.	0	5 a	51	27	Norwich.	0	04 a	52	44
Carlile.	0	10 s	54	57	Northampton.	0	04 s	52	18
Cheſter.	0	11 s	53	20	Oxford.	0	05 s	51	54
Coventry.	0	4 s	52	30	Okenham.	0	03 s	52	44
Carmerthen.	0	17 s	52	2	Peterborough.	0	02 s	52	35
Chicheſter.	0	3 s	50	56	Richmond.	0	06 s	54	26
Colcheſter.	0	5 a	52	4	Rocheſter.	0	03 a	51	28
Darby.	0	5 s	53	6	S.Michaels Mount in Corn.	0	23 s	50	38
Dublin in Ireland.	0	26 s	53	11	Stafford.	0	08 s	52	55
Dureſme.	0	5 s	54	45	Stamford.	0	02 s	52	41
Dartmouth.	0	15 s	50	32	Shrewsbury.	0	11 s	52	48
Eely.	0	1 a	52	20	Tredah in Ireland.	0	27 s	53	38
Grantham.	0	2 s	52	58	Uppingham in Rutland.	0	03 s	52	40
Glocеſter.	0	9 s	52	00	Warwick.	0	06 s	52	25
Halifax.	0	6 s	53	49	Wincheſter.	0	05 s	51	10
Hartford.	0	1 s	51	50	Waterford in Ireland.	0	27 s	52	22
Hereford.	0	11 s	52	14	Worceſter.	0	09 s	52	20
Huntington.	0	1 s	52	19	Yarmouth.	0	06 a	52	45
Hull.	0	1 s	53	50	York.	0	04 s	54	00
Lancaſter.	0	11 s	54	8	LONDON.	0	00	51	32
Leiceſter.	0	4 s	52	40					

Theſe places in *England* are for the moſt part exactly rectified by the Author; but the Catalogue of forreign Cities (which is collected out of the beſt Authors that have yet wrote) is not conſentaneous to Obſervation: As *Uraniburge* ought to be (by my Obſervation) from *London* 1 houre 3 min. *Rome* 1 houre 6 min. *Paris* 10 min. *Venice* 1 houre 3 min. &c.

A Table

A Table of the Reduction of the Dayes of the Julian *Year to Dayes of the* Gregorian *Year*, & contra.

Frō the 5 of *Octo.*		*Anno Dom.* 1582	Adde Days		*Anno Dom.*	Adde Days		*Anno Dom.*	Adde Days
Frō the 24 of *Feb.*	B	1600	10		3100	22		4600	33
		1700	11	B	3200	22		4700	34
		1800	12		3300	23	B	4800	34
		1900	13		3400	24		4900	35
	B	2000	13		3500	25		5000	36
		2100	14	B	3600	25		5100	37
		2200	15		3700	26	B	5200	37
		2300	16		3800	27		5300	38
	B	2400	16		3900	28		5400	39
		2500	17	B	4000	28		5500	40
		2600	18		4100	29	B	5600	40
		2700	19		4200	30		5700	41
	B	2800	19		4300	31		5800	42
		2900	20	B	4400	31		5900	43
		3000	21		4500	32	B	6000	43

FOraſmuch as the Earth in the ſpace of 365 Days, 5 hours, 48′ 55″, doth make her Annuall Revolution in her peculiar Orbite, departing from ſome known Point thereof, and returning to the ſame again, which we call the Tropicall year, it therefore commeth to paſſe, that the Julian year conteining 365 Days, 6 Hours, (as it was formerly eſtabliſhed by the Church) muſt needs exceed the true year 11′ 5″, which Defect, ſince the firſt eſtabliſhment thereof, hath much altered, not onely the Paſchall ſolemnity, but alſo the *Equinoxes* and *Solſtices*, and therefore Pope *Gregory* 13, to bring the Paſchall ſolemnity, and the *Equinoxes* and *Solſtices* to their Seats, (they were in, at the time of the Nicene Councell, *Anno* 322, (for the *Equinox* was then the 21 of *March*) he ordered, that, for its Reſtitution, there ſhould be 10 days omitted in the moneth of *October* 1582, and ſo the 5 day ſhould be accounted the 15, and from thence ſo to continue till the year 1700, *Feb.* 24, at which time the *Gregorian* year muſt exceed the Julian 11 days, and from that year incluſive every 4 Centenarie to be *Biſſextile*, and the three former Centenaries of years, to be Common years, and no Intercalation to be obſerved in them, whereby every 400 years ſhall gain 3 days of what the Julian loſes, and this is to be obſerved after the year 1600. See *Maginus Can. 10 & 11. in Æquab. & Apparent. Mot. Tab. & Origan. Part. 1 Ephemeridum.* The Exceſſe or Difference of which accounts we have till the year 6000, given you in the former Table.

When therefore you are to reduce Days of the Julian year into the Days of the Gregorian year, enter the Table, and the Days there found adde to the days of the Julian year given. Admit the time propoſed were the 5 of *May* 2310, therefore againſt 2300, I finde 16 days, which being added to the 5 day maketh 21. So that I conclude the 5 of *May* 2310 *Stylo Juliano*, is the 21 of the ſame Moneth *Stylo Gregoriano*.

A Table of the Æquation of Civill Dayes (placing the Aphelion of the Earth in the 6d of *Cancer*) which may ſerve, without any ſenſible errour, for this and the enſuing Age.

Degr.	♈ Subſtr. ′ ″	♉ Adde. ′ ″	♊ Adde. ′ ″	♋ Subſtr. ′ ″	♌ Subſtra. ′ ″	♍ Subſtr. ′ ″	♎ Adde. ′ ″	♏ Adde. ′ ″	♐ Adde. ′ ″	♑ Adde. ′ ″	♒ Subſtra. ′ ″	♓ Subſtra. ′ ″
0	4 4	4 41	6 23	0 26	7 07	5 07	4 04	12 09	11 11	0 26	10 27	11 43
1	3 4	4 54	6 16	0 43	7 13	4 53	4 24	12 18	10 58	0 S 00	10 41	11 35
2	3 4	5 05	6 09	1 00	7 19	4 39	4 44	12 25	10 43	0 26	10 53	11 25
3	3 06	5 17	6 01	1 18	7 23	4 24	5 04	12 33	10 29	0 52	11 05	11 16
4	2 46	5 28	5 53	1 35	7 26	4 09	5 24	12 40	10 13	1 19	11 17	11 05
5	2 26	5 38	5 43	1 52	7 29	3 54	5 44	12 46	9 57	1 44	11 27	10 54
6	2 06	5 47	5 33	2 09	7 31	3 38	6 04	12 51	9 39	2 09	11 37	10 42
7	1 47	5 56	5 23	2 27	7 33	3 22	6 23	12 56	9 21	2 35	11 47	10 30
8	1 27	6 04	5 12	2 43	7 34	3 05	6 43	13 00	9 02	2 59	11 54	10 17
9	1 08	6 11	5 01	2 59	7 34	2 47	7 02	13 03	8 43	3 25	12 02	10 04
10	0 48	6 19	4 49	3 16	7 33	2 31	7 20	13 05	8 23	3 50	12 08	9 51
11	0 29	6 25	4 36	3 32	7 32	2 13	7 39	13 07	8 04	4 14	12 14	9 37
12	0 10	6 31	4 23	3 47	7 31	1 54	7 58	13 08	7 43	4 38	12 19	9 22
13	0 A 09	6 36	4 10	4 02	7 28	1 36	8 15	13 08	7 22	5 02	12 24	9 08
14	0 27	6 41	3 56	4 17	7 25	1 18	8 33	13 07	7 00	5 25	12 27	8 52
15	0 45	6 46	3 42	4 32	7 22	0 59	8 49	13 06	6 38	5 48	12 30	8 34
16	1 03	6 48	3 27	4 46	7 17	0 40	9 07	13 04	6 15	6 10	12 32	8 20
17	1 21	6 51	3 13	5 00	7 11	0 20	9 23	13 01	5 51	6 32	12 33	8 04
18	1 38	6 53	2 57	5 13	7 06	0 01	9 38	12 57	5 27	6 53	12 34	7 47
19	1 56	6 54	2 42	5 25	6 59	0 A 19	9 54	12 52	5 04	7 15	12 33	7 29
20	2 13	6 55	2 26	5 37	6 52	0 40	10 09	12 47	4 40	7 35	12 32	7 12
21	2 29	6 55	2 09	5 49	6 44	1 00	10 23	12 41	4 15	7 55	12 30	6 54
22	2 45	6 54	1 52	6 00	6 36	1 20	10 37	12 34	3 50	8 14	12 28	6 36
23	3 02	6 53	1 36	6 11	6 27	1 41	10 50	12 27	3 26	8 33	12 25	6 17
24	3 17	6 50	1 19	6 21	6 17	2 01	11 03	12 18	2 39	8 51	12 22	5 59
25	3 32	6 47	1 02	6 31	6 06	2 22	11 16	12 09	2 34	9 09	12 17	5 40
26	3 47	6 44	0 45	6 39	5 55	7 43	11 27	11 58	2 09	9 27	12 12	5 21
27	4 01	6 40	0 27	6 47	5 44	3 03	11 38	11 48	1 43	9 43	12 05	5 02
28	4 15	6 35	0 S 09	6 54	5 32	3 23	11 49	11 37	1 17	9 58	11 58	4 43
29	4 28	6 29	0 08	7 01	5 20	3 43	11 59	11 25	0 52	10 13	11 52	4 23
30	4 41	6 23	0 26	7 07	5 07	4 04	12 09	11 11	0 26	10 27	11 43	4 04

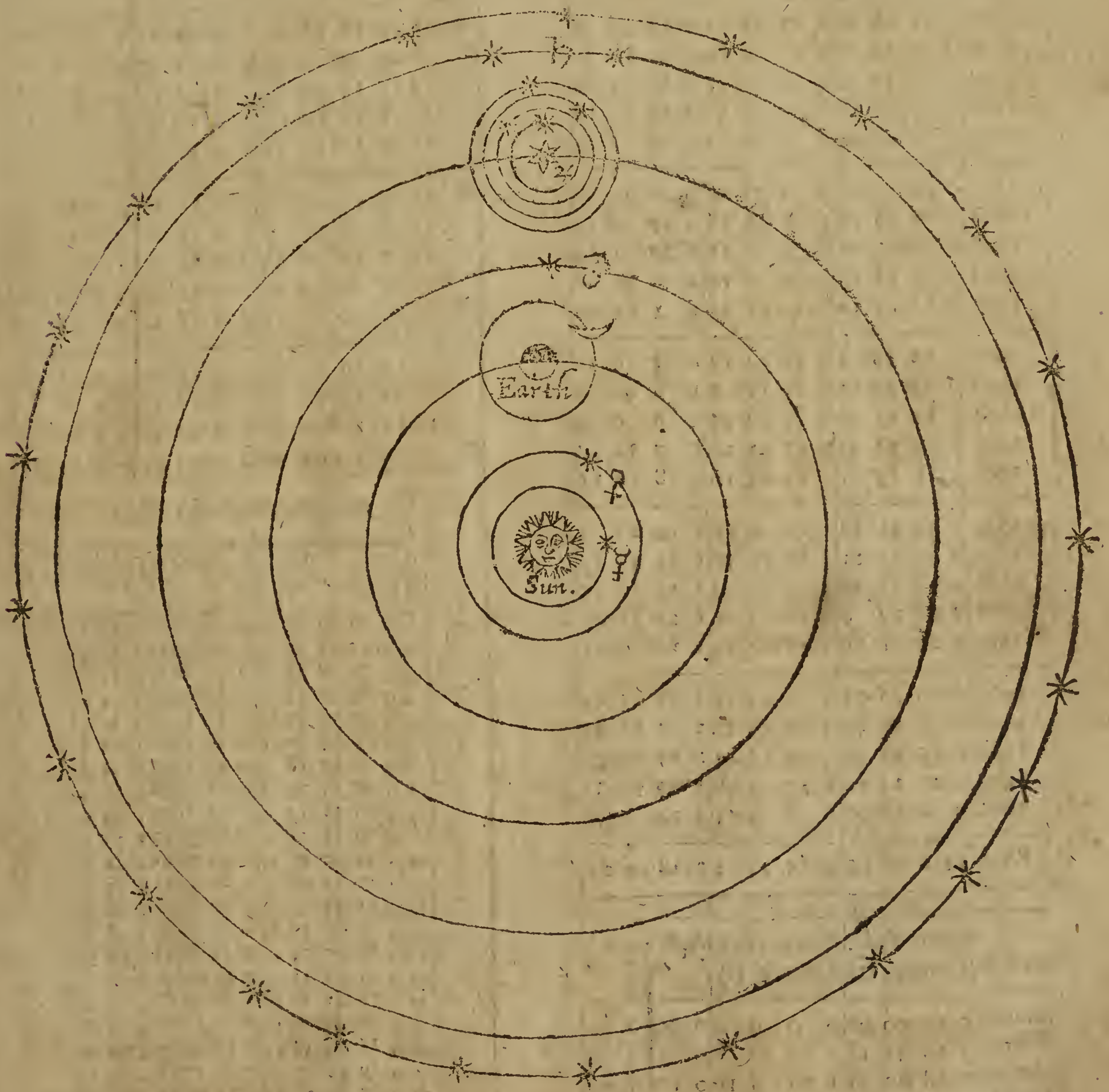
The Uſe.

ENter this Table with the Suns place, finding the Signe on the Head, and the degree in the firſt Columne on the left Side, the Common Angle will ſhew the Æquation in Minutes and Seconds, which according to the Titles A or S, muſt be added or ſubſtracted to or from the equall time given, that it may be made apparent; But the Contrary Title muſt be applyed when the Apparent is to be converted into the equall.

TABLES

Of the Middle Motions and Æquations of SOL, LUNA, SATURN, JUPITER, MARS, VENUS, and MERCURY.

Veri Mundi Syſtematis Schema.



Rom. 1. 20. *Inviſibilia Dei à creatura Mundi per ea quæ facta ſunt intellecta conſpiciuntur.*

LONDON:
Printed by ROBERT LEYBOURN, for the
Company of STATIONERS, 1651.

A Table of the middle Motion of the Sun, and Fixed Stars, for Years of the Chriſtian Æra, according to the Julian Account.

9·9·30.16

Years of Chriſt.	Longitude of ☉				Aphelion of ☉				Motion of Fixed ✳			
	s	d	′	″	s	d	′	″	s	d	′	″
001	9	8	00	31	2	8	20	3	0	4	58	38
101	9	8	45	24	2	10	2	46	0	6	23	32
201	9	09	30	16	2	11	45	29	0	7	48	26
301	9	10	15	09	2	13	28	12	0	9	13	20
401	9	11	00	1	2	15	10	54	0	10	38	13
501	9	11	44	54	2	16	53	37	0	12	3	7
601	9	12	29	47	2	18	36	20	0	13	28	1
701	9	13	14	40	2	20	19	3	0	14	52	55
801	9	13	59	32	2	22	1	46	0	16	17	49
901	9	14	44	25	2	23	44	29	0	17	42	43
1001	9	15	29	18	2	25	27	12	0	19	7	37
1101	9	16	14	11	2	27	9	54	0	20	32	31
1201	9	16	59	3	2	28	52	37	0	21	57	25
1301	9	17	43	56	3	0	35	20	0	23	22	19
1401	9	18	28	49	3	2	18	2	0	24	47	13
1501	9	19	13	41	3	4	00	45	0	26	12	6
1601	9	19	58	34	3	5	43	28	0	27	36	59
1701	9	20	43	27	3	7	26	11	0	29	1	54
1801	9	21	28	19	3	9	8	54	1	0	26	48
1901	9	22	13	12	3	10	51	37	1	1	51	42
2001	9	22	58	5	3	12	34	19	1	3	16	35
2101	9	23	42	57	3	14	17	2	1	4	41	29
2201	9	24	27	50	3	15	59	45	1	6	6	23
2301	9	25	12	43	3	17	42	28	1	7	31	17
2401	9	25	57	35	3	19	25	10	1	8	56	11
2501	9	26	42	28	3	21	7	53	1	10	21	5
2601	9	27	27	21	3	22	50	36	1	11	45	59
2701	9	28	12	14	3	24	33	19	1	13	10	53
2801	9	28	57	6	3	26	16	1	1	14	35	47
2901	9	29	41	59	3	27	58	54	1	16	0	41
3001	10	0	26	52	3	29	41	27	1	17	25	34
4001	10	8	25	39	4	16	48	44	2	1	34	33
5001	10	15	24	25	5	3	55	41	2	15	43	32
6001	10	22	23	12	5	21	2	48	2	29	52	31
7001	11	0	21	58	6	8	9	55	3	14	1	30
8001	11	8	20	45	6	25	17	2	3	28	10	29

Months	Com. Year. Longit. ☉				Leap-year. Longit. ☉				Aph		fix.*	
									′	″	′	″
Januar.	0	00	00	00	0	0	0	0	0	00	0	00
Febru.	1	00	33	18	1	0	33	18	0	05	0	04
March	1	28	09	11	1	29	8	19	0	10	0	09
Aprill	2	28	42	30	2	29	41	38	0	15	0	13
May	3	28	16	39	3	29	15	48	0	20	0	18
June	4	28	49	58	4	29	49	2	0	25	0	22
July	5	28	24	7	5	29	23	15	0	31	0	26
Auguſt	6	28	57	25	6	29	56	34	0	36	0	29
Septẽb	7	29	30	44	8	0	29	52	0	42	0	33
Octob.	8	29	4	54	9	0	4	2	0	47	0	38
Nove.	9	29	38	12	10	0	37	20	0	52	0	42
Decem	10	29	12	22	11	0	11	30	0	57	0	46

A Table of the Annuall Motion of the Sun and Fixed Stars, for ſupplying the intermediate Years of the former Table.

Years included.		Longitude of ☉				Aphel. of ☉				Motion of the fixed ✳			
		s	d	′	″	s	d	′	″	s	d	′	″
	80	00	00	35	54	0	1	22	10	0	1	7	55
	60	00	00	26	56	0	1	1	38	0	0	50	57
	40	00	00	17	57	0	0	41	5	0	0	33	58
	20	00	00	8	59	0	0	20	23	0	0	17	59
	1	11	29	45	40	0	0	1	2	0	0	0	51
	2	11	29	31	20	0	0	2	4	0	0	1	42
	3	11	29	16	59	0	0	3	5	0	0	2	33
B	4	00	00	1	48	0	0	4	7	0	0	3	24
	5	11	29	47	28	0	0	5	8	0	0	4	15
	6	11	29	33	07	0	0	6	10	0	0	5	5
	7	11	29	18	47	0	0	7	12	0	0	5	56
B	8	00	00	3	35	0	0	8	13	0	0	6	47
	9	11	29	49	15	0	0	9	15	0	0	7	38
	10	11	29	34	55	0	0	10	16	0	0	8	29
	11	11	29	20	35	0	0	11	18	0	0	9	20
B	12	06	00	5	23	0	0	12	20	0	0	10	11
	13	11	29	51	3	0	0	13	21	0	0	11	3
	14	11	29	36	43	0	0	14	23	0	0	11	54
	15	11	29	22	23	0	0	15	25	0	0	12	45
B	16	00	00	7	11	0	0	16	26	0	0	13	36
	17	11	29	52	51	0	0	17	28	0	0	14	26
	18	11	29	38	31	0	0	18	29	0	0	15	17
	19	11	29	24	10	0	0	19	31	0	0	16	8
B	20	00	00	08	59	0	0	20	33	0	0	16	59

Longitude of the Sun.

Dayes	Longi ☉				H	Lon ☉			H	Lon ☉		
	s	d	′	″	′	d	′	″	′	d	′	″
1	0	00	59	08	1	0	02	28	31	1	16	23
2	0	01	58	17	2	0	04	56	32	1	18	51
3	0	02	57	25	3	0	07	24	33	1	21	19
4	0	03	56	33	4	0	09	51	34	1	23	47
5	0	04	55	42	5	0	12	19	35	1	26	15
6	0	05	54	50	6	0	14	47	36	1	28	43
7	0	06	53	58	7	0	17	15	37	1	31	11
8	0	07	53	07	8	0	19	43	38	1	33	39
9	0	08	52	15	9	0	22	11	39	1	36	06
10	0	09	51	23	10	0	24	38	40	1	38	34
11	0	10	50	32	11	0	27	06	41	1	41	13
12	0	11	49	40	12	0	29	34	42	1	43	31
13	0	12	48	48	13	0	32	02	43	1	45	59
14	0	13	47	57	14	0	34	30	44	1	48	26
15	0	14	47	05	15	0	36	58	45	1	50	54
16	0	15	46	13	16	0	39	25	46	1	53	21
17	0	16	45	22	17	0	41	53	47	1	55	49
18	0	17	44	30	18	0	44	21	48	1	58	17
19	0	18	43	38	19	0	46	49	49	2	00	44
20	0	19	42	47	20	0	49	17	50	2	03	12
21	0	20	41	55	21	0	51	45	51	2	05	40
22	0	21	41	03	22	0	54	13	32	2	08	08
23	0	22	40	12	23	0	56	42	53	2	10	36
24	0	23	39	20	24	0	59	08	54	2	13	03
25	0	24	38	28	25	1	01	36	55	2	15	31
26	0	25	37	37	26	1	04	04	56	2	17	59
27	0	26	36	45	27	1	06	32	57	2	20	27
28	0	27	35	53	28	1	09	00	58	2	22	55
29	0	28	35	02	29	1	11	27	59	2	25	23
30	0	29	34	10	30	1	13	55	60	2	27	50
31	1	00	33	18								

A Table of the abſolute Æquation of the Sun.

Signe 0.

Degrees	Anomalie co-æquated.				Æquati. ☉ *Subſtract.*			Diſtance of ☉ frō Earth.
	S	D	′	″	D	′	″	
0	0	0	00	00	0	0	0	101803
1	0	0	58	54	0	2	7	101802
2	0	1	57	49	0	4	14	101801
3	0	2	56	44	0	6	20	10180
4	0	3	55	38	0	8	27	101799
5	0	4	54	33	0	10	32	101797
6	0	5	53	29	0	12	37	101794
7	0	6	52	24	0	14	42	101791
8	0	7	51	20	0	16	47	101786
9	0	8	50	15	0	18	52	101781
10	0	9	49	10	0	20	56	101776
11	0	10	48	06	0	23	0	101770
12	0	11	47	02	0	25	3	101763
13	0	12	45	59	0	27	5	101756
14	0	13	44	56	0	29	8	101748
15	0	14	43	53	0	31	10	101741
16	0	15	42	50	0	33	11	101732
17	0	16	41	47	0	35	12	101723
18	0	17	40	44	0	37	12	101714
19	0	18	39	41	0	39	11	101705
20	0	19	38	39	0	41	10	101695
21	0	20	37	37	0	43	8	101684
22	0	21	36	36	0	45	5	101673
23	0	22	35	37	0	47	1	101661
24	0	23	34	38	0	48	57	101648
25	0	24	32	39	0	50	52	101635
26	0	25	32	41	0	52	46	101622
27	0	26	31	43	0	54	39	101609
28	0	27	30	45	0	56	32	101594
29	0	28	29	47	0	58	23	101589
30	0	29	28	50	1	0	14	101567
Anomal.	*Adde.*							

Signe 11.

Signe 1.

Anomalie co-æquated.				Æquati. ☉ *Subſtract.*			Diſtance of ☉ frō Earth.	Degrees
S	D	′	″	D	′	″		
0	29	28	50	1	0	14	101567	30
1	0	27	53	1	2	3	101549	29
1	1	26	56	1	3	51	101535	28
1	2	26	0	1	5	38	101520	27
1	3	25	5	1	7	24	101502	26
1	4	24	13	1	9	8	101483	25
1	5	23	25	1	10	51	101466	24
1	6	22	35	1	12	33	101449	23
1	7	21	45	1	14	14	101431	22
1	8	20	56	1	15	53	101411	21
1	9	20	7	1	17	31	101391	20
1	10	19	16	1	19	8	201371	19
1	11	18	25	1	20	43	101351	18
1	12	17	39	1	22	17	101331	17
1	13	16	53	1	23	50	101310	16
1	14	16	7	1	25	21	101287	15
1	15	15	22	1	26	51	101265	14
1	16	14	38	1	28	20	101243	13
1	17	13	53	1	29	47	101220	12
1	18	13	11	1	31	12	101199	11
1	19	12	30	1	32	36	101175	10
1	20	11	48	1	33	58	101150	9
1	21	11	8	1	35	19	101126	8
1	22	10	29	1	36	37	101102	7
1	23	9	50	1	37	54	101077	6
1	24	9	14	1	39	9	101052	5
1	25	8	39	1	40	23	101027	4
1	26	8	3	1	41	35	101000	3
1	27	7	29	1	42	45	100973	2
1	28	6	57	1	43	54	100948	1
1	29	6	24	1	45	0	100924	0
Adde.								Anomal.

Signe 10.

A Table of the abſolute Æquation of the Sun.

Signe 2.

Degrees	Anomalie co-æquated.				Æquati. ☉ *Subſtract.*			Diſtance of ☉ frō Earth.
	S	D	′	″	D	′	″	
0	1	29	6	24	1	45	0	100924
1	2	0	5	52	1	46	4	100897
2	2	1	5	21	1	47	7	100867
3	2	2	4	51	1	48	9	100839
4	2	3	4	24	1	49	9	100811
5	2	4	3	58	1	50	6	100782
6	2	5	3	32	1	51	2	100754
7	2	6	3	8	1	51	55	100725
8	2	7	2	46	1	52	46	100697
9	2	8	2	24	1	53	36	100668
10	2	9	2	3	1	54	24	100641
11	2	10	1	42	1	55	10	100613
12	2	11	1	21	1	55	53	100583
13	2	12	1	2	1	56	34	100554
14	2	13	0	44	1	56	13	100525
15	2	14	0	27	1	57	51	100494
16	2	15	0	13	1	58	26	100464
17	2	16	0	0	1	58	58	100434
18	2	16	59	46	1	59	29	100404
19	2	17	59	33	1	59	58	100373
20	2	18	59	21	2	0	25	100343
21	2	19	59	12	2	0	49	100312
22	2	20	59	4	2	1	12	100281
23	2	21	58	58	2	1	32	100249
24	2	22	58	52	2	1	50	100217
25	2	23	58	48	2	2	6	100180
26	2	24	58	45	2	2	19	100155
27	2	25	58	42	2	2	30	100123
28	2	26	58	41	2	2	40	100092
29	2	27	58	40	2	2	48	100061
30	2	28	58	39	2	2	53	100031
Anomal.	*Adde.* Signe 9.							

Signe 3.

Anomalie co-æquated.				Æquati. ☉ *Subſtract.*			Diſtance of ☉ frō Earth.	*Degrees*
S	D	′	″	D	′	″		
2	28	58	39	2	2	53	100031	30
2	29	58	42	2	2	55	100001	29
3	0	58	46	2	2	54	99970	28
3	1	58	49	2	2	52	99938	27
3	2	58	54	2	2	46	99906	26
3	3	59	0	2	2	39	99875	25
3	4	59	5	2	2	29	99845	24
3	5	59	11	2	2	17	99814	23
3	6	59	18	2	2	3	99782	22
3	7	59	31	2	1	46	99752	21
3	8	59	43	2	1	28	99721	20
3	9	59	56	2	1	8	99691	19
3	11	0	11	2	0	46	99660	18
3	12	0	27	2	0	20	99630	17
3	13	0	42	1	59	52	99600	16
3	14	0	58	1	59	23	99571	15
3	15	1	17	1	58	53	99540	14
3	16	1	37	1	58	20	99510	13
3	17	1	58	1	57	45	99480	12
3	18	2	21	1	57	6	99450	11
3	19	2	45	1	56	26	99421	10
3	20	3	8	1	55	45	99391	9
3	21	3	33	1	55	1	99362	8
3	22	3	56	1	54	14	99332	7
3	23	4	23	1	53	25	99303	6
3	24	4	49	1	52	33	99275	5
3	25	5	16	1	51	39	99246	4
3	26	5	46	1	50	43	99219	3
3	27	6	19	1	49	44	99191	2
3	28	7	49	1	48	44	99163	1
3	29	7	22	1	47	43	99135	0
Adde. Signe 8.								*Anomal.*

A Table of the abſolute Æquation of the Sun.

Signe 4.

Degrees	Anomalie co-æquated.				Æquati. ☉ Subſtract.			Diſtance of ☉ frõ Earth.
	S	D	′	″	D	′	″	
0	3	29	7	22	1	47	43	99135
1	4	0	7	56	1	46	40	99107
2	4	1	8	30	1	45	34	99080
3	5	2	9	5	1	44	26	99053
4	4	3	9	42	1	43	17	99027
5	4	4	10	18	1	42	5	99002
6	4	5	10	55	1	40	50	98977
7	4	6	11	35	1	39	34	98952
8	4	7	12	14	1	38	16	98928
9	4	8	12	54	1	36	56	98904
10	4	9	13	36	1	35	35	98879
11	4	10	14	17	1	34	13	98855
12	4	11	14	59	1	32	49	98832
13	4	12	15	44	1	31	22	98809
14	4	13	16	28	1	29	53	98786
15	4	14	17	13	1	28	22	98764
16	4	15	17	59	1	26	50	98741
17	4	16	18	44	1	25	16	98718
18	4	17	19	31	1	23	40	98696
19	4	18	20	20	1	22	3	98675
20	4	19	21	9	1	20	25	98654
21	4	20	21	57	1	18	45	98634
22	4	21	22	46	1	17	4	98615
23	4	22	23	34	1	15	21	98597
24	4	23	24	23	1	13	36	98578
25	4	24	25	12	1	11	49	98559
26	4	25	26	4	1	10	1	98541
27	4	26	26	59	1	8	12	98523
28	4	27	27	55	1	6	21	98506
29	4	28	28	51	1	4	29	98489
30	4	29	29	49	1	2	36	98447
Anomal.	*Adde.*							

Signe 7.

Signe 5.

Anomalie co-æquated.				Æquati. ☉ Subſtract.			Diſtance of ☉ frõ Earth.	Degrees
S	D	′	″	D	′	″		
4	29	29	49	1	2	36	98472	30
5	0	30	45	1	0	41	98457	29
5	1	31	41	0	58	46	98441	28
5	2	32	38	0	56	52	98426	27
5	3	33	35	0	54	54	98412	26
5	4	34	32	0	52	55	98398	25
5	5	35	29	0	50	56	98385	24
5	6	36	26	0	48	57	98372	23
5	7	37	24	0	46	57	98361	22
5	8	38	23	0	44	55	98350	21
5	9	39	23	0	42	52	98338	20
5	10	40	22	0	40	48	98327	19
5	11	41	23	0	38	45	98317	18
5	12	42	24	0	36	38	98308	17
5	13	43	25	0	34	33	98299	16
5	14	44	26	0	32	26	98290	15
5	15	45	27	0	30	19	98282	14
5	16	46	28	0	28	11	98275	13
5	17	47	30	0	26	3	98269	12
5	18	48	31	0	23	55	98263	11
5	19	49	33	0	21	46	98256	10
5	20	50	36	0	19	36	98251	9
5	21	51	38	0	17	26	98246	8
5	22	52	41	0	15	16	98243	7
5	23	53	43	0	13	5	98240	6
5	24	54	45	0	10	54	98237	5
5	25	55	48	0	8	43	98235	4
5	26	56	51	0	6	33	98233	3
5	27	57	54	0	4	22	98231	2
5	28	58	57	0	2	11	98230	1
6	0	0	0	0	0	0	98229	0
Adde.								Anomal.

Signe 6.

A Table of the middle Motion of the Moon, for Years of the Chriſtian Æra, according to the Julian Account.

Years of Chriſt.	Longitude of ☾ s	d	′	″	Aphelion of ☾ s	d	′	″	Node Aſcen. ☾ s	d	′	″
001	4	02	34	49	9	10	15	55	8	28	32	53
101	2	10	23	29	0	29	32	46	4	18	21	46
201	0	18	12	09	4	18	50	37	0	00	10	39
301	10	26	00	49	8	08	08	28	7	15	59	33
401	9	03	49	29	11	27	26	19	3	01	48	26
501	7	11	38	09	3	16	44	10	10	17	37	19
601	5	19	26	49	7	06	02	01	6	03	26	12
701	3	27	15	29	10	25	19	52	1	19	15	05
801	2	05	04	09	2	14	37	42	9	05	03	58
901	0	12	52	49	6	03	55	33	4	20	52	52
1001	10	20	41	29	9	23	13	24	0	06	41	45
1101	8	28	30	09	1	12	31	15	7	22	30	38
1201	7	06	18	49	5	01	49	06	3	08	19	31
1301	5	14	07	29	8	21	06	57	10	24	08	25
1401	3	21	56	09	0	10	24	48	6	09	57	18
1501	1	29	44	49	3	29	42	39	1	25	46	11
1601	0	07	33	29	7	19	00	30	9	11	35	04
1701	10	15	22	09	11	08	18	21	4	27	23	57
1801	8	23	10	49	2	27	36	12	0	13	12	50
1901	7	00	59	29	6	16	54	03	7	29	01	43
2001	5	08	48	09	10	06	11	54	3	14	50	36
2101	3	16	36	49	1	25	29	45	11	00	39	30
2201	1	24	25	29	5	14	47	36	6	16	28	23
2301	0	2	14	09	9	04	05	27	2	02	17	16
2401	10	10	02	49	0	23	23	18	9	18	06	09
2501	8	17	51	29	4	12	41	09	5	03	55	02
2601	6	25	40	09	8	01	58	59	0	19	43	55
2701	5	03	28	49	11	21	16	50	8	05	32	48
2801	3	11	17	29	3	10	34	41	3	21	21	42
2901	1	19	06	09	6	29	52	32	11	07	10	35
3001	11	26	54	49	10	19	10	23	6	22	59	28
4001	6	15	01	29	11	02	08	37	10	01	08	21
5001	1	03	08	09	11	15	07	06	1	09	17	14
6001	7	21	14	49	11	28	05	35	3	17	26	07
7001	2	09	21	29	0	01	04	04	6	25	35	00
8001	8	27	28	09	0	14	02	33	10	03	43	53

Moneths of the Common Year.

Januar.	0	0	0	0	0	0	0	0	0	0	0	0
Febru.	1	18	28	6	0	3	27	13	0	1	38	30
March	1	27	24	26	0	6	34	23	0	3	7	28
Aprill	3	15	52	32	0	10	1	37	0	4	45	57
May	4	21	10	2	0	13	22	9	0	6	21	16
June	6	9	38	8	0	16	49	22	0	7	59	46
July	7	14	55	39	0	20	9	55	0	9	35	6
Auguſt	9	3	23	44	0	23	37	8	0	11	13	35
Septẽb	10	21	51	50	0	27	4	21	0	12	52	5
Octob.	11	27	9	21	1	0	24	53	0	14	27	24
Nove.	1	15	37	26	1	3	52	7	0	16	5	54
Decem	2	20	54	57	1	7	12	39	0	17	41	13

In the Biſſextile Year, after February compleat, adde the motion of one day ro the Sum; as in March fn the Common Year, the middle Longitude of ☾ is $1^s\,27^d\,24'\,26''$, but in rhe Biſſextile (by adding the Diurnall motion $13^d\,10'\,35''$) it is $2^s\,10^d\,35'\,1''$.

A Table of the middle Motion of the Moon for ſupplying the intermediate Years of the former Table.

	Years included.	Longitude of ☾ s	d	′	″	Aphel. of ☾ s	d	′	″	Node Aſcen. ☾ s	d	′	″
	80	5	24	14	56	0	15	26	16	3	17	20	54
	60	1	10	41	12	9	11	34	42	2	20	30	40
	40	8	27	07	28	6	07	43	8	1	23	40	27
	20	4	13	33	44	3	03	51	34	0	26	50	13
	1	4	09	23	03	1	10	39	54	0	19	19	43
	2	8	18	46	05	2	21	19	49	1	08	39	26
	3	0	28	09	07	4	01	59	43	1	27	59	09
B	4	5	20	42	45	5	12	46	20	2	17	22	03
	5	10	00	05	47	6	23	26	14	3	06	41	46
	6	2	09	28	49	8	04	06	08	3	26	01	29
	7	6	18	51	52	9	14	46	3	4	15	21	12
B	8	11	11	25	29	10	25	32	39	5	04	44	05
	9	3	20	48	31	0	06	12	32	5	24	03	48
	10	8	00	11	34	1	16	52	27	6	13	23	32
	11	0	09	34	36	2	27	32	21	7	02	43	15
B	12	5	02	08	14	4	05	18	57	7	22	06	08
	13	9	11	31	16	5	18	58	51	8	11	25	51
	14	1	20	54	18	6	29	38	45	9	00	45	34
	15	6	00	17	21	8	10	18	40	9	20	05	17
B	16	10	22	50	58	9	21	05	16	10	09	28	11
	17	3	02	14	02	11	01	45	10	10	28	47	54
	18	7	11	37	04	0	12	25	04	11	18	07	37
	19	11	21	00	06	1	23	04	57	0	07	27	20
B	20	4	13	33	44	3	03	51	34	0	26	50	13

Days	Longitude ☾ s	d	′	″	Aph. ☾ d	′	″	Node ☾ d	′	″
1	0	13	10	35	0	6	41	0	3	11
2	0	26	21	10	0	13	22	0	6	21
3	1	09	31	45	0	20	3	0	9	32
4	1	22	42	20	0	26	44	0	12	43
5	2	05	52	55	0	33	25	0	15	53
6	2	19	03	30	0	40	6	0	19	4
7	3	02	14	05	0	46	48	0	22	14
8	3	15	24	40	0	53	29	0	25	25
9	3	28	35	15	1	0	10	0	28	36
10	4	11	45	50	1	6	51	0	31	46
11	4	24	56	25	1	13	32	0	34	57
12	5	08	07	00	1	20	13	0	38	8
13	5	21	17	35	1	26	54	0	41	18
14	6	04	28	10	1	33	35	0	44	28
15	6	17	38	45	1	40	6	0	47	40
16	7	00	49	20	1	46	57	0	50	50
17	7	13	59	55	1	53	38	0	54	1
18	7	27	10	30	2	0	19	0	57	11
19	8	10	21	05	2	7	0	1	0	22
20	8	23	31	40	2	13	41	1	3	33
21	9	06	42	15	2	20	23	1	6	43
22	9	19	52	50	2	27	4	1	9	54
23	10	03	03	25	2	33	45	1	13	5
24	10	16	14	00	2	40	26	1	16	15
25	10	29	24	36	2	47	7	1	19	26
26	11	12	35	11	2	53	48	1	22	37
27	11	25	45	46	3	0	29	1	25	47
28	0	08	56	21	3	7	10	1	82	58
29	0	22	06	56	3	13	51	1	32	09
30	1	05	17	31	3	20	32	1	35	19
31	1	18	28	06	3	27	13	1	38	30

Hours	Lon. ☾ d	′	″	Ap☾ ′	″	No☾ ′	″
1	0	32	56	0	17	0	8
2	1	5	53	0	33	0	16
3	1	38	49	0	50	0	24
4	2	11	49	1	7	0	32
5	2	44	46	1	24	0	40
6	3	17	39	1	40	0	48
7	3	50	35	1	57	0	56
8	4	23	32	2	14	1	4
9	4	56	28	2	30	1	12
10	5	29	25	2	57	1	19
11	6	2	21	3	4	1	27
12	6	35	18	3	21	1	35
13	7	8	14	3	27	1	43
14	7	41	10	3	54	1	51
15	8	14	7	4	11	1	59
16	8	47	3	4	27	2	7
17	9	20	0	4	44	2	15
18	9	52	56	5	1	2	23
19	10	25	53	5	18	2	31
20	10	58	49	5	34	2	39
21	11	31	46	5	51	2	47
22	12	4	42	6	8	2	55
23	12	37	39	6	24	3	3
24	13	10	35	6	41	3	11
25	13	43	32	6	58	3	19
26	14	16	28	7	15	3	27
27	14	49	20	7	31	3	34
28	15	20	21	7	48	3	42
29	15	55	17	8	5	3	50
30	16	28	14	8	2	3	58

A Table of the abſolute Æquation of the firſt inequality of the Moon.

Signe 0.

Degrees	Anomalie co-æquated.				Æquati. ☾ *Subſtract.*			Diſtance of ☾ frõ Earth.
	S	D	′	″	D	′	″	
0	0	0	0	0	0	0	0	4225
1	0	0	57	23	0	5	3	4225
2	0	1	54	41	0	9	59	4225
3	0	2	52	1	0	14	56	4225
4	0	3	49	21	0	19	55	4225
5	0	4	46	42	0	24	54	4224
6	0	5	44	3	0	29	53	4224
7	0	6	41	24	0	34	52	4224
8	0	7	38	46	0	39	50	4223
9	0	8	36	7	0	44	47	4223
10	0	9	33	31	0	49	43	4223
11	0	10	30	54	0	54	37	4222
12	0	11	28	17	0	59	29	4222
13	0	12	25	41	1	4	20	4221
14	0	13	23	5	1	9	11	4220
15	0	14	20	30	1	14	1	4220
16	0	15	17	55	1	18	50	4219
17	0	16	15	21	1	23	38	4218
18	0	17	12	48	1	28	25	4217
19	0	18	10	17	1	33	10	4216
20	0	19	7	46	1	37	53	4215
21	0	20	5	16	1	42	32	4214
22	0	21	2	48	1	47	7	4213
23	0	22	0	21	1	51	41	4212
24	0	22	57	56	1	56	14	4211
25	0	23	55	32	2	0	45	4210
26	0	24	53	9	2	5	14	4209
27	0	25	50	48	2	9	41	4207
28	0	26	48	28	2	14	9	4206
29	0	27	46	9	2	18	35	4205
30	0	28	43	49	2	23	0	4204
Anomal.	*Adde.* Signe 11.							

Signe 1.

Anomalie co-æquated.				Æquati. ☾ *Subſtract.*			Diſtance of ☾ frõ Earth.	*Degrees*
S	D	′	″	D	′	″		
0	28	43	49	2	23	0	4204	30
0	29	41	31	2	27	24	4202	29
1	0	39	15	2	31	45	4201	28
1	1	37	2	2	36	3	4199	27
1	2	34	50	2	40	16	4198	26
1	3	32	40	2	44	26	4196	25
1	4	30	31	2	48	35	4194	24
1	5	28	25	2	52	42	4192	23
1	6	26	21	2	56	45	4191	22
1	7	24	18	3	0	44	4189	21
1	8	22	17	3	4	39	4187	20
1	9	20	16	3	8	33	4185	19
1	10	18	17	3	12	25	4183	18
1	11	16	20	3	16	14	4181	17
1	12	14	25	3	20	0	4179	16
1	13	12	32	3	23	42	4277	15
1	14	10	42	3	27	20	4174	14
1	15	8	54	3	30	53	4171	13
1	16	7	10	3	34	23	4169	12
1	17	5	27	3	37	50	4167	11
1	18	3	47	3	41	13	4164	10
1	19	2	8	3	44	32	4162	9
1	20	0	33	3	47	49	4160	8
1	20	58	58	3	51	2	4157	7
1	21	57	25	3	54	9	4155	6
1	22	55	53	3	57	14	4154	5
1	23	54	25	4	0	15	4152	4
1	24	53	0	4	3	13	4150	3
1	25	51	36	4	6	6	4148	2
1	26	50	16	4	8	56	4145	1
1	27	48	58	4	11	44	4143	0
Adde. Signe 10.								*Anomal.*

A Table of the abſolute Æquation of the firſt inequality of the Moon.

Signe 2.

Degrees	Anomalie co-æquated.				Æquati. ☾ *Subſtract.*			Diſtance of ☾ frō Earth.
	S	D	′	″	D	′	″	
0	1	27	48	58	4	11	44	4143
1	1	28	47	43	4	14	27	4141
2	1	29	46	30	4	17	2	4138
3	2	0	45	18	4	18	30	4135
4	2	1	44	12	4	21	56	4133
5	2	2	43	6	4	24	20	4130
6	2	3	42	3	4	26	41	4127
7	2	4	41	1	4	28	57	4125
8	2	5	40	5	4	30	11	4122
9	2	6	39	10	4	33	18	4119
10	2	7	38	16	4	35	20	4116
11	2	8	37	25	4	37	19	4113
12	2	9	36	38	4	39	8	4110
13	2	10	35	55	4	41	0	4107
14	2	11	35	15	4	42	50	4104
15	2	12	34	35	4	44	41	4101
16	2	13	34	11	4	46	5	4098
17	2	14	33	28	4	47	29	4096
18	2	15	32	53	4	48	47	4093
19	2	16	32	27	4	50	3	4090
20	2	17	32	1	4	51	17	4087
21	2	18	31	38	4	52	28	4084
22	2	19	31	17	4	53	33	4081
23	2	20	31	0	4	54	30	4078
24	2	21	30	46	4	55	22	4075
25	2	22	30	34	4	56	9	4072
26	2	23	30	25	4	56	51	4069
27	2	24	30	19	4	57	27	4066
28	2	25	30	16	4	57	58	4063
29	2	26	30	17	4	58	25	4060
30	2	27	30	18	4	58	42	4057
Anomal	*Adde.* Signe 9.							

Signe 3.

Anomalie co-æquated.				Æquati. ☾ *Subſtract.*			Diſtance of ☾ frō Earth.	*Degrees*
S	D	′	″	D	′	″		
2	27	30	18	4	58	42	4057	30
2	28	30	24	4	58	53	4053	29
2	29	30	31	4	58	59	4050	28
3	0	30	41	4	58	58	4047	27
3	1	30	55	4	58	50	4044	26
3	2	31	10	4	58	36	4041	25
3	3	31	29	4	58	17	4038	24
3	4	31	50	4	57	56	4035	23
3	5	32	14	4	57	31	4032	22
3	6	32	40	4	57	2	4029	21
3	7	33	9	4	56	28	4026	20
3	8	33	41	4	55	45	4023	19
3	9	34	16	4	54	52	4020	18
3	10	34	55	4	53	54	4017	17
3	11	35	45	4	52	54	4014	16
3	12	36	16	4	51	51	4010	15
3	13	37	0	4	50	45	4007	14
3	14	37	46	4	49	36	4004	13
3	15	38	35	4	48	21	4001	12
3	16	39	27	4	47	2	3998	11
3	17	40	24	4	45	37	3995	10
3	18	41	23	4	44	4	3992	9
3	19	42	23	4	42	25	3989	8
3	20	43	24	4	40	38	3986	7
3	21	44	32	4	38	47	3983	6
3	22	45	40	4	36	50	3980	5
3	23	46	50	4	34	46	3977	4
3	24	48	2	4	32	39	3975	3
3	25	49	17	4	30	26	2972	2
3	26	50	34	4	28	6	3969	1
3	27	51	53	4	25	39	3966	0
Adde. Signe 8.								*Anomal.*

A Table of the abſolute Æquation of the firſt inequality of the Moon.

	Signe 4.								Signe 5.								
Degrees	Anomalie co-æquated.				Æquati. ☾ *Subſtract*			Diſt. ☾ fró Earth	Anomalie co-æquated.				Æquati. ☾ *Subſtract*			Diſt. ☾ fró Earth.	Degrees
	S	D	′	″	D	′	″		S	D	′	″	D	′	″		
0	3	27	51	53	4	25	39	3966	4	28	46	45	2	36	2	3899	30
1	3	28	53	14	4	23	7	3963	4	29	49	1	2	31	18	3897	29
2	3	29	54	37	4	20	28	3960	5	0	51	16	2	26	31	3895	28
3	4	0	56	4	4	17	52	3958	5	1	53	32	2	21	41	3898	27
4	4	1	57	34	4	15	6	3955	5	2	55	50	2	16	52	3893	26
5	4	2	59	5	4	12	14	3953	5	3	58	8	2	11	58	3891	25
6	4	4	0	38	4	9	18	3950	5	5	0	28	2	7	2	3890	24
7	4	5	2	13	4	6	18	3948	3	6	2	48	2	2	3	3889	23
8	4	6	3	50	4	3	13	3945	5	7	5	11	1	57	1	3887	22
9	4	7	5	27	4	0	3	3943	5	8	7	34	1	51	57	3886	21
10	4	8	7	7	3	56	47	3940	5	9	9	58	1	46	51	3885	20
11	4	9	8	49	3	53	24	3938	5	10	12	22	1	41	44	3884	19
12	4	10	10	33	3	49	56	3935	5	11	14	48	1	36	34	3883	18
13	4	11	12	19	3	46	24	3933	5	12	17	15	1	31	22	2882	17
14	4	12	14	8	3	42	48	3930	5	13	19	42	1	26	8	3881	16
15	4	13	15	58	3	39	6	3928	5	14	22	11	1	20	52	3880	15
16	4	14	17	50	3	35	20	3926	5	15	24	41	1	15	34	3879	14
17	4	15	19	44	3	31	28	3924	5	16	27	10	1	10	14	3878	13
18	4	16	21	41	3	27	32	3922	5	17	29	39	1	4	53	3877	12
19	4	17	23	40	3	23	33	3920	5	18	32	10	0	59	31	3876	11
20	4	18	25	37	3	19	31	3918	5	19	34	40	0	54	8	3876	10
21	4	19	27	36	3	15	26	3916	5	20	37	10	0	48	46	3875	9
22	4	20	29	37	3	11	17	3914	5	21	39	4	0	43	23	3875	8
23	4	21	31	39	3	7	4	3912	5	22	42	13	0	38	0	3874	7
24	4	22	33	43	3	2	49	3910	5	23	44	45	0	32	36	3874	6
25	4	23	35	51	2	58	32	3908	5	24	47	17	0	27	11	3874	5
26	4	24	37	58	2	54	11	3906	5	25	49	49	0	21	46	3873	4
27	4	25	40	8	2	49	47	3904	5	26	52	22	0	16	21	3873	3
28	4	26	42	19	2	45	18	3902	5	27	54	54	0	10	55	3873	2
29	4	27	44	31	2	40	42	3900	5	28	57	27	0	5	28	3873	1
30	4	28	46	45	2	36	2	3899	6	0	0	0	0	0	0	3873	0
Anomal.					*Adde.*								*Adde.*				Anoma.
	Signe 7.								Signe 6.								

A Table of the Reflection and Variation of the Moons Æquation.

Anomalie ☾ co-æquated.	True Diſtance of ☾ from ☉, or from her ☍ to □										Anomalie ☾ co-æquated.
	S 0 D 3	0 6	0 9	0 12	0 15	0 18	0 21	0 24	0 27	1 0	
	Sub.	Sub.	Subſ.	Snb.	Sub.	Sub.	Sub.	Sub.	Sub.	Sub.	
S D	D '	D '	D '	D '	D '	D '	D '	D '	D '	D '	S D
0 00	0 3	0 7	0 10	0 13	0 16	0 19	0 21	0 23	0 25	0 27	12 00
06	0 3	0 7	0 10	0 13	0 17	0 20	0 23	0 26	0 28	0 31	24
12	0 3	0 7	0 10	0 14	0 17	0 21	0 24	0 28	0 31	0 34	18
18	0 3	0 6	0 10	0 14	0 17	0 21	0 25	0 29	0 32	0 36	12
24	0 3	0 6	0 9	0 13	0 17	0 21	0 25	0 29	0 33	0 37	6
1 00	0 3	0 5	0 9	0 12	0 16	0 20	0 25	0 29	0 33	0 38	11 00
6	0 2	0 5	0 8	0 11	0 15	0 19	0 24	0 28	0 33	0 38	24
12	0 2	0 4	0 7	0 10	0 13	0 18	0 22	0 27	0 32	0 37	18
18	0 1	0 3	0 5	0 8	0 12	0 16	0 20	0 25	0 30	0 35	12
24	0 1	0 2	0 4	0 6	0 9	0 13	0 17	0 22	0 27	0 33	6
2 00	0A0	0 1	0 2	0 4	0 7	0 10	0 14	0 19	0 24	0 29	10 00
6	0 1	0A1	0A0	0 2	0 4	0 7	0 11	0 15	0 20	0 25	24
12	0 1	0 2	0 2	0A1	0 1	0 3	0 7	0 11	0 15	0 21	18
18	0 2	0 3	0 4	0 4	0A2	0A1	0 2	0 6	0 10	0 15	12
24	0 3	0 5	0 6	0 7	0 6	0 5	0A3	0 1	0 5	0 10	6
3 00	0 4	0 7	0 9	0 10	0 10	0 9	0 8	0A5	0A1	0 3	9 00
6	0 5	0 8	0 11	0 13	0 14	0 14	0 13	0 11	0 8	0A4	24
12	0 5	0 10	0 14	0 16	0 18	0 19	0 18	0 17	0 15	0 11	18
18	0 6	0 12	0 16	0 20	0 22	0 24	0 24	0 24	0 22	0 19	12
24	0 7	0 13	0 19	0 23	0 26	0 29	0 30	0 30	0 29	0 27	6
4 00	0 8	0 15	0 21	0 26	0 30	0 34	0 36	0 37	0 36	0 35	8 00
6	0 8	0 16	0 23	0 29	0 34	0 38	0 41	0 43	0 44	0 43	24
12	0 9	0 18	0 25	0 32	0 38	0 43	0 47	0 50	0 51	0 51	18
18	0 10	0 19	0 27	0 35	0 42	0 48	0 52	0 56	0 58	0 59	12
24	0 10	0 20	0 29	0 38	0 45	0 52	0 57	1 2	1 5	1 7	6
5 00	0 11	0 21	0 31	0 40	0 48	0 56	1 2	1 7	1 11	1 14	7 00
6	0 11	0 22	0 33	0 42	0 51	0 59	1 6	1 12	1 17	1 21	24
12	0 12	0 23	0 34	0 44	0 54	1 2	1 10	1 17	1 23	1 27	18
18	0 12	0 24	0 35	0 46	0 56	1 5	1 14	1 21	1 28	1 33	12
24	0 12	0 24	0 36	0 47	0 57	1 7	1 17	1 25	1 32	1 38	6
6 00	0 12	0 24	0 36	0 48	0 59	1 9	1 19	1 28	1 36	1 42	6 00
From ☌ or ☍ to □.	Subſ.	Subſ.	Subſ.	Sub.	Subſ.	Subſ.	Subſ.	Subſ.	Subſ.	Subſ.	From □ to ☌ or ☍.
	D 27 S 5	24 5	21 5	18 5	15 5	12 5	9 5	6 5	3 5	0 5	
	True Diſtance of ☾ from ☉ from □ to ☌ or ☍.										

Above the Scale Aſcending, and below the Scale Deſcending, is to be added, as A demonſtrates.

A Table of the Reflection and Variation of the Moons Æquation.

Anomalie ☾ co-æquated.	True Diſtance of ☾ from ☉, or from her ☍ to □.										co-æquated. Anomalie ☾
	S 0	0	0	0	0	0	0	0	0	1	
	D 3	6	9	12	15	18	21	24	27	0	
	Add	*Add*	*Aad*	*Ada*	*Add*	*Add*	*Add*	*Ada*	*Add*	*Add*	
S D	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	S D
6 00	0 12	0 24	0 36	0 48	0 59	1 9	1 19	1 28	1 36	1 42	6 00
06	0 12	0 24	0 36	0 48	1 0	1 10	1 20	1 30	1 38	1 46	24
12	0 12	0 24	0 36	0 48	1 0	1 11	1 22	1 32	1 40	1 49	18
18	0 12	0 24	0 36	0 48	1 0	1 11	1 22	1 32	1 42	1 51	12
24	0 12	0 24	0 36	0 48	0 59	1 11	1 22	1 33	1 42	1 52	6
7 00	0 11	0 23	0 35	0 47	0 58	0 10	1 21	1 32	1 42	1 52	5 00
6	0 11	0 22	0 34	0 45	0 57	0 9	1 20	1 31	1 41	1 51	24
12	0 10	0 21	0 32	0 44	0 55	0 7	1 18	1 29	1 39	1 49	18
18	0 10	0 20	0 31	0 42	0 53	0 4	1 15	1 26	1 37	1 47	12
24	0 9	0 19	0 29	0 40	0 50	0 1	1 12	1 23	1 34	1 44	6
8 00	0 8	0 18	0 27	0 37	0 47	0 58	1 9	1 19	1 30	1 40	4 00
6	0 8	0 16	0 25	0 35	0 44	0 55	1 5	1 15	1 25	1 35	24
12	0 7	0 15	0 23	0 32	0 41	0 51	1 1	1 11	1 20	1 30	18
18	0 6	0 13	0 21	0 29	0 38	0 47	0 56	1 6	1 14	1 24	12
24	0 5	0 12	0 18	0 26	0 34	0 42	0 51	1 0	1 9	1 18	6
9 00	0 4	0 10	0 16	0 23	0 30	0 38	0 46	0 54	1 3	1 12	3 00
6	0 4	0 8	0 14	0 20	0 26	0 33	0 41	0 48	0 57	1 4	24
12	0 3	0 7	0 11	0 16	0 22	0 29	0 35	0 42	0 50	0 58	18
18	0 2	0 5	0 9	0 13	0 18	0 24	0 30	0 36	0 43	0 50	12
24	0 1	0 4	0 6	0 10	0 14	0 19	0 24	0 30	0 36	0 43	6
10 00	0 1	0 2	0 4	0 7	0 10	0 14	0 19	0 24	0 29	0 35	2 00
6	0 1	0 1	0 2	0 4	0 7	0 10	0 14	0 18	0 23	0 28	24
12	0S 0	0S 0	0 S0	0 1	0 3	0 6	0 9	0 12	0 16	0 20	18
18	0 1	0 2	0 2	0 S1	0S 0	0 1	0 4	0 6	0 9	0 13	12
24	0 2	0 3	0 3	0 4	0 3	0S 2	0S 1	0 1	0 3	0 6	6
11 00	0 2	0 4	0 5	0 6	0 6	0 6	0 5	0S 4	0S 3	0S 1	1 00
6	0 2	0 5	0 6	0 8	0 9	0 9	0 9	0 9	0 8	0 7	24
12	0 3	0 5	0 8	0 9	0 11	0 12	0 13	0 13	0 13	0 13	18
18	0 3	0 6	0 9	0 11	0 13	0 15	0 16	0 17	0 18	0 18	12
24	0 3	0 6	0 9	0 12	0 15	0 17	0 16	0 21	0 22	0 23	6
12 00	0 3	0 7	0 10	0 13	0 16	0 19	0 21	0 23	0 25	0 26	0 00
From ☌ or ☍ to □.	*Adde*	*Adde*	*Adde*	*Adae*	*Addr*	*Adde*	*Adde*	*Adde*	*Adde*	*Adde*	From □ to ☌ or ☍.
	D 27	24	21	18	15	12	9	6	3	0	
	S 5	5	5	5	5	5	5	5	5	5	
	True Diſtance of ☾ from ☉ from □ to ☌ or ☍.										

Above the Scale Aſcending, and below the Scale Deſcending, is to be ſubſtracted, as S demonſtrates.

A Table of the Reflection and Variation of the Moons Æquation.

Anomalie ☾ co-æquated.	True Diſtance of ☾ from ☉, or from her ☍ to □.											Anomalie ☾ co-æquated
	S 1 D 0	1 3	1 6	1 9	1 12	1 15	1 18	1 21	1 24	1 27	2 0	
	Sub.	Sub.	Sub.	Sub.	Sub.	Snb.	Sub.	Sub.	Sub.	Sub.	Sub.	
S D	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	S D
0 00	0 27	0 29	0 30	0 30	0 31	0 31	0 30	0 30	0 29	0 27	0 26	12 00
06	0 31	0 33	0 35	0 36	0 37	0 38	0 38	0 38	0 38	0 37	0 37	24
12	0 34	0 36	0 39	0 41	0 43	0 44	0 46	0 46	0 47	0 47	0 47	18
18	0 36	0 39	0 42	0 45	0 48	0 50	0 52	0 54	0 55	0 56	0 56	12
24	0 37	0 41	0 45	0 48	0 52	0 55	0 57	1 1	1 2	1 4	1 5	6
1 00	0 38	0 42	0 47	0 50	0 55	0 58	1 2	1 5	1 8	1 10	1 12	11 00
6	0 38	0 42	0 47	0 52	0 57	1 1	1 5	1 9	1 13	1 16	1 19	24
12	0 37	0 42	0 47	0 52	0 58	1 3	1 7	1 12	1 16	1 20	1 24	18
18	0 35	0 40	0 46	0 52	0 57	1 3	1 9	1 14	1 19	1 24	1 28	12
24	0 33	0 38	0 44	0 50	0 56	1 3	1 9	1 14	1 20	1 26	1 31	6
2 00	0 29	0 35	0 41	0 48	0 54	1 1	1 7	1 14	1 20	1 26	1 32	10 00
6	0 25	0 31	0 38	0 44	0 51	0 58	1 5	1 12	1 19	1 26	1 32	24
12	0 21	0 27	0 33	0 40	0 47	0 54	1 0	1 9	1 17	1 24	1 31	18
18	0 15	0 21	0 27	0 34	0 41	0 49	0 56	1 5	1 13	1 21	1 29	12
24	0 10	0 15	0 21	0 28	0 35	0 43	0 51	0 59	1 7	1 16	1 24	6
3 00	0A3	0 8	0 14	0 21	0 28	0 36	0 44	0 52	1 1	1 10	1 19	9 00
6	0 4	0 1	0 6	0 13	0 20	0 28	0 36	0 44	0 54	1 3	1 12	24
12	0 11	0A7	0A2	0 4	0 11	0 19	0 27	0 36	0 45	0 55	1 4	18
18	0 19	0 15	0 10	0A5	0 2	0 9	0 17	0 26	0 35	0 45	0 55	12
24	0 27	0 24	0 20	0 14	0A8	0A1	0 7	0 15	0 25	0 34	0 44	6
4 00	0 35	0 33	0 29	0 24	0 19	0 12	0A4	0 4	0 13	0 23	0 33	8 00
6	0 43	0 41	0 38	0 34	0 29	0 23	0 16	0A8	0 1	0 11	0 20	24
12	0 51	0 50	0 48	0 45	0 40	0 35	0 28	0 21	A12	0A3	0 7	18
18	0 59	0 59	0 58	0 55	0 51	0 46	0 40	0 33	0 15	0 11	0A7	12
24	1 7	1 8	1 7	1 5	1 2	0 58	0 53	0 46	0 38	0 30	0 21	6
5 00	1 14	1 16	1 16	1 15	1 13	1 9	1 5	0 59	0 52	0 44	0 35	7 00
6	1 21	1 24	1 24	1 25	1 23	1 21	1 17	1 12	1 5	0 58	0 50	24
12	1 27	1 31	1 32	1 34	1 33	1 31	1 28	1 24	1 18	1 12	1 4	18
18	1 33	1 37	1 39	1 43	1 42	1 41	1 39	1 36	1 31	1 25	1 18	12
24	1 38	1 43	1 45	1 49	1 50	1 51	1 49	1 47	1 43	1 37	1 31	6
6 00	1 42	1 48	1 51	1 56	1 58	1 59	1 59	1 57	1 54	1 50	1 44	6 00
From ☌ or ☍ to □.	Subſ.	Subſ.	Subſ.	Subſ.	Subſ.	Subſ.	Subſ.	Subſ	Subſ	Subſ.	Subſ.	From □ to ☌ or ☍.
	D 0 S 5	27 4	24 4	21 4	18 4	15 4	12 4	9 4	6 4	3 4	0 4	

True Diſtance of ☾ from ☉ from □ to ☌ or ☍.

A Table of the Reflection and Variation of the Moons Æquation.

Anomalie ☾ co-æquated.	True Diſtance of ☾ from ⊙, or from her ☍ to □.											Anomalie ☾ co-æquated.
	S 1 D 0	1 3	1 6	1 9	1 12	1 15	1 18	1 21	1 24	1 27	2 0	
	Add.	Add	Add	Add	Add	Add	Add	Add	Add	Add	Add	
S D	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	S D
6 00	1 42	1 48	1 53	1 56	1 58	1 59	1 59	1 57	1 54	1 50	1 44	6 00
06	1 46	1 53	1 58	2 2	2 5	2 7	2 7	2 6	2 4	2 1	1 56	24
12	1 49	1 56	2 2	2 7	2 11	2 13	2 15	2 14	2 13	2 11	2 7	18
18	1 51	1 58	2 5	2 11	2 15	2 19	2 21	2 22	2 21	2 20	2 17	12
24	1 52	2 0	2 7	2 14	2 19	2 23	2 26	2 28	2 28	2 27	2 25	6
7 00	1 52	2 0	2 8	2 15	2 21	2 26	2 30	2 32	2 34	2 33	2 32	5 00
6	1 51	2 0	2 8	2 16	2 22	2 28	2 32	2 35	2 38	2 38	2 38	24
12	1 49	1 59	2 7	2 15	2 22	2 28	2 33	2 37	2 40	2 42	2 42	18
18	1 47	1 57	2 6	2 14	2 21	2 28	2 33	2 38	2 41	2 44	2 45	12
24	1 44	1 54	2 3	2 11	2 19	2 26	2 32	2 37	2 41	2 44	2 46	6
8 00	1 40	1 50	1 59	2 8	2 16	2 23	2 30	2 35	2 40	2 44	2 46	4 00
6	1 35	1 45	1 54	2 3	2 12	2 19	2 26	2 32	2 37	2 42	2 45	24
12	1 30	1 40	1 49	1 58	2 6	2 14	2 21	2 28	2 33	2 38	2 42	18
18	1 24	1 34	1 43	1 52	2 0	2 8	2 15	2 22	2 28	2 33	2 37	12
24	1 18	1 27	1 36	1 45	1 53	2 1	2 9	2 16	2 22	2 27	2 32	6
9 00	1 12	1 20	1 29	1 38	1 46	1 54	2 1	2 8	2 14	2 20	2 25	3 00
6	1 5	1 13	1 21	1 29	1 37	1 45	1 53	2 0	2 6	2 12	2 17	24
12	0 58	1 5	1 13	1 21	1 29	1 36	1 43	1 51	1 57	2 3	2 8	18
18	0 50	0 57	1 5	1 12	1 29	1 27	1 34	1 41	1 47	1 53	1 58	12
24	0 43	0 49	0 56	1 3	1 10	1 17	1 24	1 30	1 36	1 42	1 48	6
10 00	0 35	0 41	0 47	0 54	1 0	1 7	1 13	1 19	1 25	1 31	1 37	2 00
6	0 28	0 33	0 38	0 44	0 50	0 56	1 2	1 8	1 14	1 20	1 25	24
12	0 20	0 25	0 30	0 35	0 40	0 46	0 51	0 57	1 2	1 8	1 13	18
18	0 13	0 17	0 21	0 26	0 30	0 35	0 40	0 45	0 50	0 56	1 0	12
24	0 6	0 9	0 13	0 16	0 21	0 25	0 29	0 34	0 38	0 43	0 48	6
11 00	0 S1	0 2	0 4	0 8	0 11	0 15	0 18	0 22	0 27	0 31	0 35	1 00
6	0 7	0 S5	0 S3	0 S1	0 2	0 5	0 8	0 11	0 15	0 19	0 22	24
12	0 13	0 12	0 11	0 9	0 S8	0 S5	0 S2	0 S0	0 3	0 7	0 10	18
18	0 18	0 18	0 18	0 17	0 16	0 14	0 12	0 10	0 S8	0 S5	0 S3	12
24	0 23	0 24	0 24	0 24	0 23	0 23	0 22	0 20	0 19	0 17	0 14	6
12 00	0 26	0 29	0 30	0 30	0 31	0 31	0 30	0 30	0 28	0 27	0 26	0 00
From ☌ or ☍ to □.	Adde	Adde	Adde	Adde	Adde	Adde	Adde	Adde	Adde	Adde	Adde	From □ to ☌ or ☍.
	D 0 S 5	27 4	24 4	21 4	18 4	15 4	12 4	9 4	6 4	3 4	0 4	
	True Diſtance of ☾ from ⊙, from □ to ☌ or ☍.											

A Table of the Reflection and Variation of the Moons Æquation.

Anomalie ☾ co-æquated	True Diſtance of ☾ from ⊙, or from her ☍ to □.											Anomalie ☾ co-æquated.
	S 2	2	2	2	2	2	2	2	2	2	3	
	D 0	3	6	9	12	15	18	21	24	27	0	
	Sub.	Sub.	Sub.	Sub.	Sub.	Subſ.	Sub.	Sub.	Sub.	Snb.	Sub.	
S D	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	S D
0 00	0 26	0 24	0 22	0 20	0 17	0 15	0 12	0 9	0 6	0 3	0 0	12 00
06	0 37	0 36	0 34	0 32	0 30	0 28	0 26	0 23	0 20	0 18	0 15	24
12	0 47	0 46	0 46	0 44	0 43	0 41	0 39	0 37	0 34	0 32	0 29	18
18	0 56	0 56	0 56	0 56	0 55	0 54	0 52	0 50	0 48	0 46	0 43	12
24	1 5	1 6	1 6	1 6	1 6	1 5	1 4	1 3	1 1	0 59	0 57	6
1 00	1 12	1 14	1 15	1 16	1 17	1 16	1 16	1 15	1 14	1 12	1 10	11 00
6	1 19	1 21	1 23	1 24	1 26	1 27	1 27	1 26	1 26	1 25	1 23	24
12	1 24	1 27	1 30	1 32	1 34	1 36	1 36	1 37	1 37	1 36	1 35	18
18	1 28	1 32	1 36	1 38	1 41	1 43	1 45	1 46	1 47	1 46	1 46	12
24	1 31	1 36	1 40	1 44	1 47	1 50	1 53	1 54	1 55	1 56	1 56	6
2 00	1 32	1 38	1 43	1 48	1 52	1 56	1 59	2 1	2 3	2 4	2 5	10 00
6	1 32	1 39	1 45	1 50	1 55	2 0	2 3	2 7	2 9	2 11	2 12	24
12	1 21	1 38	1 46	1 51	1 57	2 2	2 7	2 11	2 14	2 17	2 19	18
18	1 29	1 36	1 45	1 51	1 57	2 3	2 9	2 13	2 18	2 21	2 24	12
24	1 24	1 33	1 44	1 49	1 56	2 3	2 9	2 15	2 20	2 24	2 27	6
3 00	1 19	1 28	1 37	1 45	1 53	2 0	2 8	2 14	2 20	2 25	2 29	9 00
6	1 12	1 21	1 31	1 40	1 48	1 57	2 5	2 12	2 18	2 24	2 30	24
12	1 4	1 14	1 24	1 33	1 42	1 51	2 0	2 9	2 15	2 22	2 28	18
18	0 55	1 5	1 15	1 25	1 35	1 45	1 54	2 3	2 11	2 18	2 25	12
24	0 44	0 55	1 5	1 16	1 26	1 36	1 46	1 56	2 5	2 13	2 20	6
4 00	0 33	0 44	0 54	1 6	1 16	1 26	1 37	1 47	1 57	2 6	2 14	8 00
6	0 20	0 31	0 42	0 54	1 4	1 15	1 26	1 37	1 47	1 57	2 6	24
12	0 A7	0 18	0 29	0 40	0 51	1 2	1 14	1 25	1 36	1 47	1 57	18
18	0 7	0 4	0 15	0 26	0 37	0 49	1 1	1 13	1 24	1 35	1 46	12
24	0 21	A11	0 A0	0 11	0 23	0 35	0 47	0 59	1 11	1 22	1 33	6
5 00	0 35	0 25	0 15	0 A4	0 8	0 20	0 32	0 44	0 56	1 8	1 20	7 00
6	0 50	0 40	0 30	0 19	0 A8	0 4	0 16	0 28	0 41	0 53	1 5	24
12	1 4	0 55	0 45	0 35	0 24	A12	0 A0	0 12	0 25	0 37	0 50	18
18	1 18	1 10	1 1	0 51	0 40	0 28	0 16	0 A4	0 8	0 21	0 33	12
24	1 31	1 24	1 15	1 6	0 56	0 45	0 33	0 21	0 A8	0 4	0 17	6
6 00	1 44	1 37	1 29	1 21	1 11	1 0	0 49	0 37	0 25	A13	0 0	6 00
From ☌ or ☍ to □.	Sub.	Subſ.	Subſ.	Subſ.	Subſ.	Subſ.	Subſ.	Subſ.	Subſ.	Subſ.	Adde	From □ to ☌ or ☍.
	D 0	27	24	21	18	15	12	9	6	3	0	
	S 4	3	3	3	3	3	3	3	3	3	3	
	True Diſtance of ☾ from ⊙, from □ to ☌ or ☍.											

A Table of the Reflection and Variation of the Moons Æquation.

Anomalie ☾ co-æquated.		True Diſtance of ☾ from ⊙, or from her ☍ to □.											Anomalie ☾ co-æquated.	
		S 2	2	2	2	2	2	2	2	2	2	3		
		D 0	3	6	9	12	15	18	21	24	27	0		
		Add	*Add*	*Add*	*Add*	*Add*	*Add*	*Add*	*Add*	*Add*	*Add*	*Add*		
S	D	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	S	D
6	00	1 44	1 37	1 29	1 21	1 11	1 0	0 49	0 37	0 25	0 13	0 0	6	00
	06	1 56	1 50	1 43	1 35	1 26	1 16	1 5	0 54	0 42	0 29	0 17		24
	12	2 7	2 2	1 56	1 48	1 40	1 30	1 20	1 9	0 58	0 46	0 33		18
	18	2 17	2 12	2 7	2 0	1 53	1 44	1 35	1 24	1 13	1 2	0 50		12
	24	2 25	2 22	2 17	2 11	2 5	1 57	1 48	1 38	1 28	1 17	1 5		6
7	00	2 31	2 30	2 26	2 21	2 15	2 8	2 0	1 51	1 41	1 31	1 20	5	00
	6	2 38	2 36	2 34	2 30	2 24	2 18	2 11	2 3	1 54	1 44	1 33		24
	12	2 42	2 42	2 40	2 36	2 32	2 27	2 20	2 13	2 5	1 56	1 46		18
	18	2 45	2 45	2 44	2 42	2 38	2 34	2 28	2 22	2 14	2 6	1 57		12
	24	2 46	2 47	2 47	2 45	2 43	2 39	2 35	2 29	2 22	2 15	2 6		6
8	00	2 46	2 48	2 48	2 47	2 46	2 43	2 39	2 34	2 29	2 22	2 14	4	00
	6	2 45	2 47	2 48	2 48	2 47	2 45	2 42	2 38	2 33	2 27	2 20		24
	12	2 42	2 44	2 46	2 47	2 47	2 46	2 44	2 40	2 37	2 31	2 25		18
	18	2 37	2 41	2 43	2 45	2 45	2 45	2 43	2 41	2 38	2 33	2 28		12
	24	2 32	2 36	2 39	2 31	2 42	2 42	2 41	2 40	2 37	2 34	2 30		6
9	00	2 25	2 29	2 33	2 35	2 37	2 38	2 38	2 37	2 35	2 33	2 29	3	00
	6	2 17	2 22	2 25	2 29	2 31	2 32	2 33	2 33	2 32	2 30	2 27		24
	12	2 8	2 13	2 17	2 21	2 24	2 26	2 27	2 27	2 27	2 26	2 24		18
	18	1 58	2 3	2 8	2 12	2 15	2 17	2 19	2 20	2 21	2 20	2 19		12
	24	1 48	1 53	1 58	2 2	2 5	2 8	2 11	2 12	2 13	2 13	2 12		6
10	00	1 37	1 42	1 47	1 51	1 55	1 58	2 1	2 3	2 4	2 5	2 5	2	00
	6	1 25	1 30	1 35	1 39	1 43	1 47	1 50	1 52	1 54	1 55	1 56		24
	12	1 13	1 18	1 23	1 27	1 31	1 35	1 38	1 41	1 43	1 45	1 46		18
	18	1 0	1 5	1 10	1 14	1 18	1 22	1 25	1 28	1 31	1 33	1 35		12
	24	0 48	0 52	0 57	1 1	1 5	1 9	1 12	1 16	1 18	1 21	1 23		6
11	00	0 35	0 39	0 44	0 48	0 52	0 55	0 59	1 2	1 5	1 8	1 10	1	00
	6	0 22	0 26	0 30	0 34	0 38	0 41	0 45	0 48	0 51	0 54	0 57		24
	12	0 10	0 13	0 17	0 20	0 24	0 27	0 31	0 34	0 37	0 40	0 43		18
	18	0 S 3	0 S 0	0 4	0 7	0 10	0 13	0 16	0 20	0 23	0 26	0 29		12
	24	0 14	0 12	S 10	0 S 7	0 S 4	0 S 1	0 2	0 5	0 8	0 12	0 15		6
12	00	0 26	0 24	0 22	0 20	0 17	0 15	S 12	0 S 9	0 S 6	0 S 3	0 0	0	00
From ☌ or ☍ to □.		*Add*	*Add*	*Add*	*Add*	*Add*	*Add*	*Add*	*Add*	*Add*	*Add*	*Sub.*	From □ to ☌ or ☍.	
		D 0	27	24	21	18	15	12	9	6	3	0		
		S 4	3	3	3	3	3	3	3	3	3	3		
		True Diſtance of ☾ from ⊙, from □ to ☌ or ☍.												

The Sexagenarie Table of the Motion of the Moone from the Sunne in Longitude.

Degrees.	S D ' ''	D ' '' '''	' '' ''' ''''	'' ''' '''' v	Degrees.	S D ' ''	D ' '' '''	' '' ''' ''''	'' ''' '''' v
0	0	0	0	0	30	6	5	43	21
1	0	12	11	27	31	6	17	54	47
2	0	24	22	53	32	6	30	6	14
3	0	36	34	20	33	6	42	17	41
4	0	48	45	37	34	6	54	29	7
5	1	0	57	13	35	7	6	40	34
6	1	13	8	40	36	7	18	52	1
7	1	25	20	7	37	7	31	3	28
8	1	37	31	34	38	7	43	14	54
9	1	49	43	0	39	7	55	26	21
10	2	1	54	27	40	8	7	37	48
11	2	14	5	54	41	8	19	49	14
12	2	26	17	20	42	8	32	0	41
13	2	38	28	47	43	8	44	12	8
14	2	50	40	14	44	8	56	23	34
15	3	2	51	40	45	9	8	35	1
16	3	15	3	7	46	9	20	46	28
17	3	27	14	34	47	9	32	57	54
18	3	39	26	0	48	9	45	9	21
19	3	51	37	27	49	9	57	20	48
20	4	3	48	54	50	10	9	32	15
21	4	16	0	20	51	10	21	43	41
22	4	28	11	47	52	10	33	55	8
23	4	40	23	14	53	10	46	6	35
24	4	52	34	41	54	10	58	18	1
25	5	4	46	7	55	11	10	29	28
26	5	16	57	34	56	11	22	40	55
27	5	29	9	1	57	11	34	52	21
28	5	41	20	27	58	11	47	3	48
29	5	53	31	54	59	11	59	15	15
30	6	5	43	21	60	12	11	26	41

A Table of the Reduction of the Moone from Her Orbite to the Ecliptiqne, & contrariwiſe.

Degrees.	Sign.0 Sign.6 *Adde.* '	''	Signe1 Signe7 *Adde.* '	''	Signe2 Signe8 *Adde.* '	''	Degrees.
0	0	0	6	6	6	6	30
1	0	15	6	12	5	58	29
2	0	30	6	18	5	49	28
3	0	45	6	24	5	40	27
4	0	59	6	29	5	32	26
5	1	13	6	39	5	22	25
6	1	27	6	40	5	13	24
7	1	42	6	44	5	2	23
8	1	56	6	47	4	52	22
9	2	10	6	51	4	31	21
10	2	24	6	54	4	30	20
11	2	38	6	56	4	19	19
12	2	52	6	57	4	8	18
13	3	6	6	58	3	56	17
14	3	19	6	59	3	43	16
15	3	32	7	0	3	32	15
16	3	43	6	59	3	19	14
17	3	56	6	58	3	6	13
18	4	8	6	57	2	51	12
19	4	19	6	56	2	38	11
20	4	30	6	54	2	23	10
21	4	41	6	51	2	9	9
22	4	52	6	47	1	56	8
23	5	2	6	44	1	42	7
24	5	13	6	40	1	27	6
25	5	22	6	35	1	13	5
26	5	31	6	28	0	59	4
27	5	40	1	23	0	45	3
28	5	49	6	17	0	30	2
29	5	58	6	11	0	15	1
30	6	6	6	6	0	0	0
Degrees.	*Subſtr* Signe5 Sign11		*Subſtr.* Signe4 Sign10		*Subſtr.* Signe3 Signe9		Degtees.

A Table of the Proportionall minutes of the *Moons* Latitude.

Enter this Table with the Æquated diſtance of the Moon from the Sun.

Degrees.	Signe 0.		Signe 1.		Signe 2.		*Degrees.*
	Prop.	min.	Propo.	min.	Propo.	min.	
	′	″	′	″	′	″	
0	0	0	15	0	45	0	30
1	0	1	15	55	45	54	29
2	0	4	16	51	46	47	28
3	0	10	17	48	47	38	27
4	0	18	18	46	48	29	26
5	0	27	19	44	49	17	25
6	0	33	20	43	50	5	24
7	0	53	21	44	50	51	23
8	1	10	22	45	51	35	22
9	1	28	23	46	52	17	21
10	1	49	24	48	52	59	20
11	2	11	25	49	53	38	19
12	2	36	26	51	54	16	18
13	3	3	27	53	54	52	17
14	3	31	28	56	55	27	16
15	4	1	30	0	55	59	15
16	4	33	31	4	56	29	14
17	5	8	32	7	56	57	13
18	5	44	33	10	57	24	12
19	6	22	34	11	57	49	11
20	7	1	35	12	58	11	10
21	7	43	36	14	58	32	9
22	8	25	37	16	58	50	8
23	9	9	38	17	59	7	7
24	9	55	39	17	59	21	6
25	10	43	40	16	59	33	5
26	11	31	41	14	59	42	4
27	12	22	42	12	59	50	3
28	13	19	43	9	59	56	2
29	14	6	44	5	59	59	1
30	15	0	45	0	60	0	0
	Signe 5.		Signe 4.		Signe 3.		

Enter this Table with the Æquated diſtance of the Moon from the Sun.

A Table of the Latitude of the Moon.

Nor	Signe. 0.					Signe. 1.					Signe. 2.					Aſc
Sou	Signe. 6.					Signe. 7.					Signe. 8.					Deſ
Degres	Latitude ☾.			Exceſs.		Latitude ☾.			Exceſs.		Latitude ☾.			Exceſs.		Degres
	D	'	"	'	"	D	'	"	'	"	D	'	"	'	"	
0	0	0	0	0	0	2	29	52	8	30	4	19	43	14	43	30
1	0	5	14	0	18	2	34	22	8	45	4	22	18	14	52	29
2	0	10	27	0	36	2	38	50	9	0	4	24	49	15	0	28
3	0	15	41	0	54	2	43	15	9	15	4	27	14	15	8	27
4	0	20	54	1	12	2	47	37	9	30	4	29	34	15	16	26
5	0	26	17	1	29	2	51	56	9	45	4	31	50	15	24	25
6	0	31	19	1	47	2	56	11	10	0	4	34	0	15	31	24
7	0	36	31	2	5	3	0	24	10	14	4	36	6	15	38	23
8	0	41	42	2	22	3	4	33	10	28	4	38	6	15	45	22
9	0	46	52	2	40	3	8	39	10	42	4	40	2	15	52	21
10	0	52	2	2	57	3	12	42	11	56	4	41	52	15	58	20
11	0	57	10	3	15	3	16	41	11	9	4	43	37	16	4	19
12	1	2	18	3	32	3	20	36	11	22	4	45	17	16	10	18
13	1	7	24	3	49	3	24	28	11	35	4	46	52	16	15	17
14	1	12	29	4	7	3	28	16	11	48	4	48	21	16	20	16
15	1	17	33	4	24	3	32	0	12	1	4	49	45	16	25	15
16	1	22	36	4	41	3	35	40	12	13	4	51	4	16	29	14
17	1	27	37	4	58	3	39	17	12	25	4	52	17	16	33	13
18	1	32	36	5	15	3	42	49	12	37	4	53	26	16	37	12
19	1	37	34	5	32	3	46	17	12	49	4	54	29	16	41	11
20	1	42	30	5	49	3	49	42	13	1	4	55	26	16	44	10
21	1	47	24	6	5	3	53	2	13	12	4	56	18	16	47	9
22	1	52	16	6	22	3	56	17	13	23	4	57	4	16	49	8
23	1	57	6	6	38	3	59	29	13	34	4	57	45	16	52	7
24	2	1	54	6	55	4	2	36	13	45	4	58	21	16	54	6
25	2	6	39	7	11	4	5	38	13	55	4	58	51	16	56	5
26	2	11	23	7	27	4	8	37	14	5	4	59	16	16	57	4
27	2	16	4	7	43	4	11	30	14	14	4	59	35	16	58	3
28	2	20	42	7	58	4	14	19	14	24	5	59	49	16	59	2
29	2	25	18	8	14	4	17	4	14	33	4	59	57	17	0	1
30	2	29	52	8	30	4	19	43	14	43	5	0	0	17	0	0
	Signe. 11.					Signe. 10.					Signe. 9.					
	Signe. 5.					Signe. 4.					Signe. 3.					

A Table of the Horizontall Parallax, Hourely Motions, and Semidiameters of the Sunne and Moon.

Anom. ☉ & ☾ coæqu.		Horiſō. Paralla of ☉.		Hourly motion of ☉.		Semidiamerer of ☉		Horizōtall Par. of ☾.		Hourely motion of ☾.		Semidiameter of ☾		Anom. ☉ & ☾ coæq.	
S	D	′	″	′	″	′	″	′	″		″	′	″	D	′
0	0	2	18	2	23	16	9	55	43	29	40	15	35	12	0
	6	2	18	2	23	16	9	55	43	29	41	15	35		24
	12	2	18	2	23	16	9	55	46	29	44	15	36		18
	18	2	18	2	23	16	10	55	50	29	49	15	37		12
	24	2	18	2	23	16	10	55	55	29	58	15	38		6
1	0	2	19	2	24	16	11	56	1	30	9	15	40	11	0
	6	2	19	2	24	16	12	56	7	30	22	15	42		24
	12	2	19	2	24	16	14	56	16	30	37	15	44		18
	18	2	19	2	25	16	15	56	27	30	54	15	47		12
	24	2	19	2	25	16	16	56	38	31	12	15	50		6
2	0	2	20	2	25	16	18	56	50	31	33	15	54	10	0
	6	2	20	2	26	16	19	57	5	31	56	15	58		24
	12	2	20	2	26	16	21	57	20	32	19	16	2		18
	18	2	20	2	27	16	22	57	34	32	43	16	6		12
	24	2	20	2	27	16	24	57	50	33	7	16	9		6
3	0	2	20	2	28	16	25	58	5	33	42	16	13	9	0
	6	2	21	2	29	16	29	58	20	33	58	16	17		24
	12	2	21	2	29	16	31	58	37	34	23	16	22		18
	18	2	21	2	30	16	33	58	53	34	47	16	27		12
	24	2	21	2	30	16	35	59	7	35	11	16	31		6
4	0	2	21	2	31	16	37	59	22	35	35	16	36	8	0
	6	2	21	2	31	16	38	59	37	35	59	16	39		24
	12	2	22	2	32	16	39	59	51	36	22	16	42		18
	18	2	22	2	32	16	40	60	4	36	43	16	46		12
	24	2	22	2	32	16	41	60	14	37	3	16	49		6
5	0	2	22	2	32	16	42	60	23	37	22	16	52	7	0
	6	2	22	2	33	16	43	60	32	37	38	16	55		24
	12	2	22	2	33	16	44	60	39	37	52	16	57		18
	18	2	23	2	33	16	44	60	44	38	1	16	58		12
	24	2	23	2	33	16	45	60	48	38	7	16	59		6
6	0	2	23	2	33	16	45	60	49	38	10	17	0	6	0

A Table ſhewing the Diſtance of the true Oppoſition and Conjunction, from the greateſt Obſcuration.

Latitude.	Difference.		Latitude.	Difference.		Latitude.	Difference.	
Min.	′	″	Min.	′	″	Min	′	″
0	0	0	30	2	37	60	5	14
1	0	5	31	2	42	61	5	19
2	0	10	32	2	47	62	5	24
3	0	16	33	2	53	63	5	30
4	0	21	34	2	58	64	5	35
5	0	26	35	3	3	65	5	40
6	0	31	36	3	8	66	5	45
7	0	36	37	3	13	67	5	50
8	0	42	38	3	19	68	5	56
9	0	47	39	3	24	69	6	1
10	0	52	40	3	29	70	6	6
11	0	57	41	3	34	71	6	11
12	1	2	42	3	39	72	6	17
13	1	8	43	3	45	73	6	22
14	1	13	44	3	50	74	6	27
15	1	18	45	3	55	75	6	33
16	1	23	46	4	0	76	6	38
17	1	28	47	4	5	77	6	43
18	1	34	48	4	11	78	6	49
19	1	39	49	4	16	79	6	54
20	1	45	50	4	21	80	6	59
21	1	50	51	4	26	81	7	4
22	1	55	52	4	31	82	7	9
23	2	1	53	4	37	83	7	15
24	2	6	54	4	42	84	7	20
25	2	11	55	4	47	85	7	25
26	2	16	56	4	52	86	7	30
27	2	21	57	4	57	87	7	35
28	2	27	58	5	3	88	7	41
29	2	32	59	5	8	89	7	46
30	2	37	60	5	14	90	7	51

Latitude { North Deſcending, South Aſcending } Adde.
Latitude { North Aſcending, South Deſcending } Subſtract.

A Table of the Declination of the Ecliptique, and of the angls of the Ecliptique and Meridian Circle.

	♈			♎		♉			♏		♊			♐		
Deg. Deſc.	Declinatió			Angle of Ecli. & Meridian.		Declinatió			Angle of Ecli. & Meridian.		Declinatió			Angle of Ecli. & Meridian.		Deg. Aſce.
	D	′	″	D	′	D	′	″	D	′	D	′	″	D	′	
0	0	0	0	66	29	11	30	42	69	21	20	13	22	77	44	30
1	0	23	56	66	30	11	51	48	69	32	20	25	57	78	6	29
2	0	47	53	66	30	12	12	40	69	45	20	38	9	78	28	28
3	1	11	49	66	31	12	33	21	69	57	20	49	58	78	50	27
4	1	35	49	66	33	12	53	50	70	10	21	1	25	79	13	26
5	1	59	37	66	34	13	14	5	70	23	21	12	9	79	35	25
6	2	23	28	66	36	13	34	7	70	36	21	23	7	79	58	24
7	2	47	16	66	39	13	53	57	70	51	21	33	22	80	21	23
8	3	11	4	66	42	14	13	32	71	5	21	43	15	80	44	22
9	3	34	47	66	45	14	32	53	71	20	21	51	14	81	8	21
10	3	58	28	66	49	14	51	59	71	34	22	1	45	81	32	20
11	4	22	4	66	52	15	10	50	71	50	22	10	22	81	57	19
12	4	45	37	66	56	15	29	26	72	6	22	18	35	82	21	18
13	5	9	5	67	1	15	47	47	72	22	22	26	22	82	45	17
14	5	32	29	67	7	16	5	51	72	38	22	33	44	83	10	16
15	5	55	47	67	12	16	23	39	72	54	22	40	39	83	35	15
16	6	18	58	67	18	16	41	9	73	10	22	47	10	84	0	14
17	6	42	6	67	24	16	58	22	73	27	22	53	13	83	25	13
18	7	5	6	67	30	17	15	18	73	45	22	58	51	84	50	12
19	7	28	0	67	38	17	31	54	74	5	23	4	3	85	15	11
20	7	50	46	67	46	17	48	14	74	23	23	8	47	85	41	10
21	8	13	26	67	53	18	4	14	74	41	23	13	5	86	6	9
22	8	35	58	68	1	18	19	57	75	0	23	16	56	86	32	8
23	8	58	20	68	10	18	35	18	75	19	23	20	20	86	58	7
24	9	20	34	68	20	18	50	21	75	39	23	23	18	87	24	6
25	9	42	41	68	28	19	5	4	75	59	23	25	48	87	50	5
26	10	4	38	68	38	19	19	26	76	20	23	27	51	88	16	4
27	10	26	24	68	48	19	33	27	76	40	23	29	27	88	42	3
28	10	48	2	68	59	19	47	7	77	1	23	30	35	89	8	2
29	11	9	27	69	10	20	0	26	77	23	23	31	17	89	34	1
30	11	30	42	69	21	20	13	22	77	44	23	31	30	90	0	0
	♍			♓		♌			♒		♋			♑		

A Table of the Refraction of the Sun, Moon, and Fixed Stars, according to the Obſervations of *Tycho Brahe.*

Degres of Altitude.	☉		☾		Stars.		Degres of Altitude.	☉		☾	
	′	″	′	″	′	″		′	″	′	″
0	34	0	33	0	30	0	23	3	10	4	10
1	26	0	25	0	21	30	24	2	50	3	45
2	20	0	20	0	15	30	25	2	30	3	20
3	17	0	17	0	12	30	26	2	15	3	40
4	15	30	15	20	11	0	27	2	0	3	0
5	14	30	14	20	10	0	28	1	45	2	30
6	13	30	13	50	9	0	29	1	35	2	0
7	12	45	12	45	8	15	30	1	25	1	40
8	11	15	12	0	6	45	31	1	15	1	30
9	10	30	11	20	6	0	32	1	5	1	20
10	10	0	10	45	5	30	33	0	55	1	10
11	9	30	10	10	5	0	34	0	45	1	0
12	9	0	9	35	4	30	35	0	35	0	50
13	8	30	9	0	4	0	36	0	30	0	45
14	8	0	8	30	3	30	37	0	25	0	40
15	7	30	8	0	3	0	38	0	20	0	35
16	7	0	7	30	2	30	39	0	15	0	30
17	6	30	7	0	2	0	40	0	10	0	25
18	5	45	6	30	1	15	41	0	9	0	20
19	5	0	6	0	0	30	42	0	8	0	15
20	4	30	4	30	0	0	43	0	7	0	10
21	4	0	5	0	0	0	44	0	6	0	5
22	3	30	4	35			45	0	5	0	0

The Refraction is to be taken from the Altitude Obſerved, that the true Altitude may be had: being alſo to be corrected by Parallax.

A Table of the Middle Motion of SATURN, for Yeares of the Christian Æra, according to the Julian Account.

Yeares of Christ.	Longitude of ♄ S D ′ ″	Aphelion of ♄. S D ′ ″	Nod. Aſcen. ♄. S D ′ ″
001	2 12 52 01	7 20 18 42	3 04 28 29
101	7 06 20 21	7 22 32 32	3 05 28 44
201	11 29 48 40	7 24 46 22	3 06 28 59
301	4 23 17 00	7 27 0 12	3 07 29 14
401	9 16 45 20	7 29 14 2	3 08 29 29
501	2 10 13 39	8 01 27 52	3 09 29 44
601	7 03 41 59	8 03 41 41	3 10 29 59
701	11 27 10 19	8 05 55 31	3 11 30 15
801	4 20 38 39	8 08 09 21	3 12 30 30
901	9 14 06 59	8 10 23 11	3 13 30 45
1001	2 07 35 18	8 12 37 01	3 14 31 00
1101	7 01 03 38	8 14 50 51	3 15 31 15
1201	11 24 31 58	8 17 04 40	3 16 31 30
1301	4 18 00 18	8 19 18 30	3 17 31 45
1401	9 11 28 38	8 21 32 20	3 18 32 00
1501	2 04 56 57	8 23 46 10	3 19 32 15
1601	6 28 25 17	8 26 00 10	3 20 32 31
1701	11 21 53 37	8 28 13 49	3 21 32 46
1801	4 15 21 57	9 00 27 39	3 22 33 01
1901	9 08 50 17	9 02 41 29	3 23 33 16
2001	2 02 18 36	9 04 55 19	3 24 33 31
2101	6 25 46 56	9 07 09 09	3 25 33 46
2201	11 19 15 16	9 09 22 59	3 26 34 01
2301	4 12 43 36	9 11 36 48	3 27 34 16
2401	9 06 11 56	9 13 50 38	3 28 34 31
2501	1 29 40 15	9 16 04 28	3 29 34 46
2601	6 23 08 35	9 18 18 18	4 00 35 02
2701	11 16 36 55	9 20 32 08	4 01 35 17
2801	4 10 05 15	9 22 45 58	4 02 35 32
2901	9 03 33 35	9 24 59 47	4 03 35 47
3001	1 27 01 54	9 27 13 37	4 04 36 02
4001	1 21 45 12	10 19 31 55	4 14 38 33
5001	1 16 28 30	11 11 50 13	4 24 41 04
6001	1 11 11 48	0 04 08 31	5 04 43 35
7001	1 05 55 06	0 26 26 49	5 14 46 06
8001	1 00 38 24	1 18 49 07	5 24 48 37

Months	Com. Ye. Lon. ♄ D ′ ″	Biſſ. Year Longi. ♄ D ′ ″	Aphe- ♄ D ′ ″	No. Aſ. ♄ D ′ ″
Januar.	0 0 0	0 0 00	0 0 0	0 0 0
Febru.	1 2 18	1 2 18	0 0 6	0 0 3
March	1 58 35	2 0 35	0 0 12	0 0 6
Aprill	3 0 53	3 2 54	0 0 19	0 0 0
May	4 1 11	4 3 12	0 0 27	0 0 12
June	5 3 29	5 5 30	0 0 35	0 0 15
July	6 3 46	6 5 47	0 0 41	0 0 18
Auguſt	7 6 4	7 8 04	0 0 47	0 0 21
Septēb	8 8 23	8 10 23	0 0 54	0 0 24
Octob.	9 8 40	9 10 41	0 1 0	0 0 27
Nove.	10 10 58	10 12 59	0 1 7	0 0 30
Decem	11 11 16	11 13 17	0 1 13	0 0 33

A Table of the Annuall Motion of ♄, for ſupplying the intermediate Yeares of the former Table.

Years included.	Longitude of ♄ S D ′ ″	Aphelion of ♄ S D ′ ″	No. Aſc. ♄ D ′ ″
80	8 18 46 40	0 1 47 04	0 48 12
60	0 14 05 00	0 1 20 18	0 36 09
40	4 09 23 20	0 0 53 32	0 24 06
20	8 04 41 40	0 0 26 46	0 12 03
1	0 12 13 34	0 0 01 20	0 00 36
2	0 24 27 10	0 0 2 41	0 01 12
3	1 06 40 44	0 0 4 01	0 01 48
B 4	1 18 56 20	0 0 5 21	0 02 25
5	2 01 09 54	0 0 6 41	0 03 01
6	2 13 23 30	0 0 8 02	0 03 37
7	2 25 37 04	0 0 9 22	0 04 13
B 8	3 07 52 40	0 0 10 42	0 04 49
9	3 20 06 15	0 0 12 03	0 05 25
10	4 02 19 49	0 0 13 23	0 06 01
11	4 14 33 24	0 0 14 43	0 06 37
B 12	4 26 48 59	0 0 16 04	0 07 14
13	5 09 02 34	0 0 17 24	0 07 50
14	5 21 16 09	0 0 18 44	0 08 26
15	6 03 29 43	0 0 20 04	0 09 02
B 16	6 15 45 19	0 0 21 25	0 09 38
17	6 27 58 59	0 0 22 45	0 10 14
18	7 10 12 29	0 0 24 05	0 10 51
19	7 26 36 04	0 0 25 26	0 11 27
B 20	8 04 41 40	0 0 26 46	0 12 03

Dayes.	Longit. of ♄ D ′ ″		H ′	Lon. ♄ ′ ″	H ′	Lonit. ♄ ′ ″
1	0 02 00		1	0 05	31	2 36
2	0 04 01		2	0 10	32	2 41
3	0 06 02		3	0 15	33	2 46
4	0 08 02		4	0 20	34	2 51
5	0 10 03		5	0 25	35	2 56
6	0 12 04		6	0 30	36	3 01
7	0 14 04		7	0 35	37	3 06
8	0 16 05		8	0 40	38	3 11
9	0 18 05		9	0 45	39	3 16
10	0 20 06		10	0 50	40	3 22
11	0 22 07		11	0 55	41	3 27
12	0 24 07		12	1 00	42	3 32
13	0 26 08		13	1 05	43	3 37
14	0 28 08		14	1 10	44	3 42
15	0 30 09		15	1 15	45	3 47
16	0 32 09		16	1 20	46	3 52
17	0 34 10		17	1 25	47	3 57
18	0 36 11		18	1 30	48	4 02
19	0 38 11		19	1 35	49	4 07
20	0 40 12		20	1 40	50	4 12
21	0 42 12		21	1 45	51	4 17
22	0 44 13		22	1 50	52	4 22
23	0 46 14		23	1 55	53	4 27
24	0 48 14		24	2 00	54	4 32
25	0 50 15		25	2 06	55	4 37
26	0 52 15		26	2 11	56	4 42
27	0 54 16		17	2 16	57	4 48
28	0 56 17		28	2 21	58	4 53
29	0 58 17		29	2 26	59	4 58
30	1 00 18		30	2 31	60	5 03
31	1 02 18		′	″ ‴	′	″ ‴

A Table of the abſolute Æquation of the firſt inequality of Saturn.

	Signe 0.								Signe 1.								
Degrees	Anomalie co-æquated.				Æquati. ♄ *Subſtract*			Diſtance of ♄ from ☉.	Ano malie co-æquated.				Æquati. ♄ *Subſtract.*			Diſtance of ♄ from ☉.	Degrees.
	S	D	′	″	D	′	″		S	D	′	″	D	′	″		
0	0	0	0	0	0	0	0	1008090	0	28	18	43	3	6	41	1001501	30
1	0	0	56	27	0	6	29	1008079	0	29	15	42	3	12	21	1001049	29
2	0	1	52	56	0	12	56	1008052	1	0	12	43	3	17	58	1000586	28
3	0	2	49	24	0	19	26	1008011	1	1	9	44	3	23	33	1000123	27
4	0	3	45	51	0	25	54	1007953	1	2	6	49	3	29	5	999649	26
5	0	4	42	19	0	32	28	1007880	1	3	3	55	3	34	35	999154	25
6	0	5	38	47	0	38	57	1007799	1	4	1	4	3	40	1	998666	24
7	0	6	35	14	0	45	26	1007707	1	4	58	16	3	45	23	998143	23
8	0	7	31	44	0	51	51	1007592	1	5	55	30	3	50	42	997617	22
9	0	8	28	14	0	58	14	1007467	1	6	52	46	3	55	57	997068	21
10	0	9	24	45	1	4	28	1007337	1	7	50	3	4	1	8	996527	20
11	0	10	21	16	1	11	0	1007180	1	8	47	24	4	6	15	995975	19
12	0	11	17	48	1	17	22	1007025	1	9	44	48	4	11	18	995397	18
13	0	12	14	21	1	23	43	10068[illegible]3	1	10	42	15	4	16	18	994743	17
14	0	13	10	54	1	30	2	1006618	1	11	39	45	4	21	14	994200	16
15	0	14	7	28	1	36	21	1006390	1	12	37	17	4	26	7	993584	15
16	0	15	4	4	1	42	37	1006178	1	13	34	52	4	30	54	992960	14
17	0	16	0	40	1	48	52	1006[illegible]35	1	14	32	30	4	35	35	992315	13
18	0	16	57	17	1	55	5	1005609	1	15	30	10	4	40	14	991650	12
19	0	17	53	53	2	1	18	1005396	1	16	27	53	4	44	47	990990	11
20	0	18	50	33	2	7	25	1005102	1	17	25	40	4	49	14	990327	10
21	0	19	47	13	2	14	31	1004791	1	18	23	29	4	53	37	989653	9
22	0	20	43	55	2	19	37	1004537	1	19	21	20	4	57	57	988950	8
23	0	21	40	39	2	25	39	1004179	1	20	19	13	5	2	22	988229	7
24	0	22	37	24	2	31	39	1003839	1	21	17	9	5	6	33	987520	6
25	0	23	34	12	2	37	35	1003482	1	22	15	9	5	10	41	986803	5
26	0	24	31	3	2	43	30	1003095	1	23	13	12	5	14	42	986070	4
27	0	25	27	55	2	49	22	1002720	1	24	11	21	5	18	38	985302	3
28	0	26	24	44	2	55	11	1002274	1	25	9	3	5	22	29	984550	2
29	0	27	21	44	3	0	58	1001882	1	26	7	46	5	26	15	183789	1
30	0	28	18	43	3	6	41	1001501	1	27	6	4	5	29	59	983020	0
Anomal.					*Adde.*								*Adde.*				Anom.
	Signe 11.								Signe 10.								

A Table of the abſolute Æquation of the firſt inequality of Saturn.

Signe 2.

Degrees	Anomalie co-æquated.				Æquati. ♄ *Subſtract.*			Diſtant of ♄ from ⊙.
	S	D	′	″	D	′	″	
0	1	27	6	4	5	29	59	983020
1	1	28	4	24	5	33	35	982235
2	1	29	2	48	5	37	6	981437
3	2	0	1	15	5	40	33	980628
4	2	0	59	45	5	43	53	979820
5	2	1	58	18	5	47	9	979005
6	2	2	56	55	5	50	15	978178
7	2	3	55	37	5	53	8	977355
8	2	4	54	22	5	56	13	976489
9	2	5	53	10	5	59	4	975639
10	2	6	52	0	6	1	48	974779
11	2	7	50	54	6	4	27	973916
12	2	8	49	52	6	7	2	973041
13	2	9	48	55	6	9	30	972159
14	2	10	48	1	6	11	53	971274
15	2	11	47	10	6	14	8	970386
16	2	12	46	22	6	16	15	969492
17	2	13	45	39	6	18	16	968573
18	2	14	45	0	6	20	10	967685
19	2	15	44	24	6	22	0	966766
20	2	16	43	53	6	23	42	965847
21	2	17	43	23	6	25	17	964930
22	2	18	42	58	6	26	45	963997
23	2	19	42	37	6	28	7	963055
24	2	20	42	18	6	29	22	962122
25	2	21	42	2	6	30	28	961180
26	2	22	41	51	6	31	29	960364
27	2	23	41	44	6	32	25	959288
28	2	24	41	42	6	33	14	958339
29	2	25	41	42	6	33	55	957388
30	2	26	41	46	6	34	28	956427
Anomal.					*Adde.*			

Signe 9.

Signe 3.

Anomalie co-æquated.				Æquati. ♄ *Subſtract.*			Diſtance of ♄ frō ⊙	Degrees
S	D	′	″	D	′	″		
2	26	41	46	6	34	28	956425	30
2	27	41	55	6	34	54	955471	29
2	28	42	6	6	35	13	954516	28
2	29	42	20	6	35	24	953559	27
3	0	42	39	6	35	24	952601	26
3	1	43	2	6	35	21	951644	25
3	2	43	30	6	35	17	950601	24
3	3	43	59	6	34	58	949722	23
3	4	44	32	6	34	33	948763	22
3	5	45	8	6	33	59	947806	21
3	6	45	48	6	33	18	946848	20
3	7	46	31	6	32	31	945886	19
3	8	47	17	6	31	38	944935	18
3	9	48	7	6	30	34	943977	17
3	10	49	0	6	29	26	943022	16
3	11	49	58	6	28	8	942074	15
3	12	51	0	6	26	45	941124	14
3	13	52	5	6	25	13	940174	13
3	14	53	12	6	23	33	939234	12
3	15	54	23	6	21	46	938295	11
3	16	55	38	6	19	52	937357	10
3	17	56	57	6	17	49	936421	9
3	18	58	18	6	15	40	935493	8
3	19	59	42	6	13	24	934572	7
3	21	1	9	6	10	58	933654	6
3	22	2	39	6	8	25	932738	5
3	23	3	11	6	5	45	931845	4
3	24	5	48	6	3	0	930942	3
3	25	7	27	6	0	5	930052	2
3	26	9	9	5	57	4	929125	1
3	27	10	55	5	53	55	928295	0
				Adde.				Anomal.

Signe 8.

A Table of the abſolute Æquation of the firſt inequality of Saturn.

Signe 4.

Degrees	Anomalie co-æquated. S	D	′	″	Æquati. ♄ Subſtract. D	′	″	Diſtance of ♄ from ☉.
0	3	27	10	55	5	53	55	928295
1	3	28	12	43	5	50	40	927430
2	3	29	14	35	5	47	17	926564
3	4	0	16	30	5	43	47	925712
4	4	1	18	28	5	40	9	924862
5	4	2	20	31	5	36	25	924022
6	4	3	22	36	5	32	34	923171
7	4	4	24	42	5	28	38	922360
8	4	5	26	50	5	24	32	921556
9	4	6	29	0	5	20	19	920756
10	4	7	31	12	5	16	0	919971
11	4	8	33	26	5	11	34	919201
12	4	9	35	44	5	7	3	918394
13	4	10	38	6	5	2	25	917642
14	4	11	40	28	5	57	42	916901
15	4	12	42	54	4	52	52	916157
16	4	13	45	24	4	47	57	915417
17	4	14	47	54	4	42	54	914700
18	4	15	50	27	4	37	44	914002
19	4	16	53	2	4	32	31	913311
20	4	17	55	39	4	27	12	912632
21	4	18	58	20	4	21	45	911953
22	4	20	1	1	4	16	14	911302
23	4	21	3	44	4	10	37	910677
24	4	22	6	29	4	4	52	910064
25	4	23	9	16	3	59	4	909457
26	4	24	12	4	3	53	12	908861
27	4	25	14	55	3	47	15	908272
28	4	26	17	48	3	41	12	907717
29	4	27	20	42	3	35	4	907181
30	4	28	23	38	3	28	52	906637
Anomal.					Adde.			

Signe 7.

Signe 5.

Ano malie co-æquated. S	D	′	″	Æquati. ♄ Subſtract. D	′	″	Diſtance of ♄ from ☉.	Degrees.
4	28	23	38	3	28	52	906637	30
4	29	26	34	3	22	35	906122	29
5	0	29	34	3	16	15	905618	28
5	1	32	34	3	9	52	905128	27
5	2	35	36	3	3	27	904670	26
5	3	38	40	2	56	54	904225	25
5	4	41	45	2	50	15	903767	24
5	5	44	51	2	43	33	903348	23
5	6	47	58	2	36	48	902934	22
5	7	51	5	2	30	0	902534	21
5	8	54	15	2	23	11	902169	20
5	9	57	25	2	16	21	901811	19
5	11	0	38	2	9	31	901472	18
5	12	3	50	2	2	36	901151	17
5	13	7	4	1	55	39	900864	16
5	14	10	17	1	48	36	900580	15
5	15	13	34	1	41	30	900308	14
5	16	16	56	1	34	21	900061	13
5	17	20	7	1	27	10	899838	12
5	18	23	24	1	20	1	899635	11
5	19	26	41	1	12	51	899445	10
5	20	29	59	1	5	39	899260	9
5	21	33	17	0	58	26	899099	8
5	22	36	36	0	51	12	898959	7
5	23	39	57	0	43	57	898837	6
5	24	43	18	0	36	42	898728	5
5	25	46	38	0	29	26	898642	4
5	26	49	59	0	22	7	898573	3
5	27	53	19	0	14	47	898527	2
5	28	56	39	0	7	24	898494	1
6	0	0	0	0	0	0	898490	0
				Adde.				Anom.

Signe 6.

A Table of the Inclination, Reduction, and Curtation, of SATURN.

Argument of Latitude,

Nor Sou Degres	Signe. 0. Signe. 6.				Signe. 1. Signe. 7.				Signe. 2. Signe. 8.				Sig. 0 Sig. 6		Sig. 1 Sig. 7		Sig. 2 Sig. 8		Si. 0 Si. 6	Si. 1 Si. 7	Si. 2 Si. 8	Degrees
	Inclination.				Inclination.				Inclination.				Reduction.						Curtation.			
	Parts	D	′	″	Parts	D	′	″	Parts	D	′	″	′	″	′	″	′	″	Part	Part	Part	
0	0	0	0	0	20840	1	15	15	36096	2	10	19	0	0	1	27	1	27	0	230	684	30
1	727	0	2	37	21467	1	17	31	36454	2	11	37	0	4	1	29	1	25	0	243	698	29
2	1454	0	5	15	22087	1	19	46	36801	2	12	53	0	8	1	30	1	23	1	256	711	28
3	2181	0	7	52	22701	1	21	59	37137	2	14	6	0	11	1	32	1	21	2	270	723	27
4	2907	0	10	30	23307	1	24	10	37462	2	15	16	0	15	1	34	1	19	4	285	736	26
5	3633	0	13	6	23907	1	26	18	37775	2	16	23	0	18	1	35	1	17	6	300	748	25
6	4357	0	15	44	24499	1	28	26	38077	2	17	28	0	22	1	36	1	15	9	315	760	24
7	5080	0	18	21	25084	1	30	32	38367	2	18	31	0	25	1	37	1	13	13	330	772	23
8	5801	0	20	57	25661	1	32	37	38645	2	19	32	0	28	1	48	1	11	18	346	784	22
9	6520	0	23	33	26230	1	34	41	38912	2	20	30	0	32	1	39	1	8	23	361	796	21
10	7238	0	26	8	26792	1	36	43	39166	2	21	25	0	35	1	39	1	5	28	377	807	20
11	7953	0	28	42	27345	1	38	44	39409	2	22	18	0	38	1	40	1	3	34	393	817	19
12	8666	0	31	16	27890	1	40	42	39640	2	23	8	0	42	1	40	1	0	40	409	826	18
13	9376	0	33	50	28426	1	42	38	39858	2	23	55	0	45	1	41	0	57	47	425	835	17
14	10083	0	36	23	28954	1	44	32	40065	2	24	40	0	48	1	41	0	54	54	441	843	16
15	10788	0	38	56	29422	1	46	24	40260	2	25	22	0	51	1	41	0	51	63	457	851	15
16	11489	0	41	27	29982	1	48	15	40442	2	26	1	0	54	1	41	0	48	71	473	859	14
17	12186	0	43	59	30483	1	50	3	40612	2	26	38	0	57	1	40	0	45	79	489	867	13
18	12880	0	46	29	30981	1	51	49	40769	2	27	12	1	0	1	40	0	42	88	505	874	12
19	13570	0	48	59	31456	1	53	34	40914	2	27	44	1	3	1	39	0	38	97	521	880	11
20	14255	0	51	27	31929	1	55	16	41047	2	28	13	1	5	1	39	0	35	107	537	886	10
21	14937	0	53	55	32391	1	56	56	41167	2	28	40	1	8	1	38	0	32	118	553	891	9
22	15614	0	56	22	32844	1	58	34	41274	2	29	3	1	11	1	38	0	28	130	568	896	8
23	16286	0	58	48	33287	2	0	10	41369	2	29	24	1	13	1	37	0	25	142	584	901	7
24	16953	1	1	11	33720	2	1	44	41451	2	29	41	1	15	1	36	0	22	154	599	905	6
25	17615	1	3	35	34142	2	3	16	41521	2	29	55	1	17	1	35	0	18	166	614	908	5
26	18271	1	5	57	34554	2	4	45	41579	2	30	9	1	19	1	34	0	15	178	629	910	4
27	18923	1	8	18	34956	2	6	13	41623	2	30	19	1	21	1	32	0	11	191	644	912	3
28	19568	1	10	38	35347	2	7	37	41654	2	30	26	1	23	1	30	0	8	203	658	913	2
29	20207	1	12	57	35727	2	8	59	41673	2	30	29	1	25	1	29	0	4	216	671	914	1
30	20840	1	15	15	36096	2	10	19	41680	2	30	30	1	27	1	27	0	0	230	684	914	0
Nor Sou	Signe. 11. Signe. 5.				Signe. 10. Signe. 4.				Signe. 9. Signe. 3.				Sig. 5 Si. 11		Sig. 4 Si. 10		Sig. 3 Sig. 9		Si. 5 S. 11	Si. 4 S. 10	Si. 3 Si. 9	Argu.

Argument of Latitude

A Table of the Middle Motion of JUPITER, for Yeares of the Chriſtian Æra, according to the Julian Account.

Yeares of Chriſt.	Longitude of ♃				Aphelion of ♃.				Nod. Aſcen. ♃.			
	S	D	′	″	S	D	′	″	S	D	′	″
001	5	29	49	47	5	11	11	40	2	29	39	15
101	11	06	08	07	5	12	51	50	3	00	00	55
201	4	12	26	28	5	14	32	00	3	00	22	35
301	9	18	44	48	5	16	12	10	3	00	44	16
401	2	25	03	08	5	17	52	20	3	01	05	56
501	8	01	21	28	5	19	32	30	3	01	27	36
601	1	07	39	49	5	21	12	40	3	01	49	17
701	6	13	58	09	5	22	52	50	3	02	10	57
801	11	20	16	29	5	24	33	00	3	02	32	37
901	4	26	34	49	5	26	13	10	3	02	54	18
1001	10	2	53	10	5	27	53	20	3	03	15	58
1101	3	9	11	30	5	29	33	30	3	03	37	38
1201	8	15	29	50	6	01	13	40	3	03	59	16
1301	1	21	48	10	6	02	53	50	3	04	20	59
1401	6	28	6	31	6	04	34	00	3	04	42	39
1501	0	4	24	51	6	06	14	10	3	05	04	20
1601	5	10	43	11	6	07	54	20	3	05	26	00
1701	10	17	1	31	6	09	34	30	3	05	47	40
1801	3	23	19	52	6	11	14	40	3	06	09	21
1901	8	29	38	12	6	12	54	50	3	06	31	01
2001	2	5	56	32	6	14	35	00	3	06	52	41
2101	7	12	14	52	6	16	15	10	3	07	14	22
2201	0	18	33	13	6	17	55	20	3	07	36	02
2301	5	24	51	33	6	19	35	30	3	07	57	42
2401	11	1	9	53	6	21	15	40	3	08	19	23
2501	4	7	28	13	6	22	55	50	3	08	41	03
2601	9	13	46	34	6	24	36	00	3	09	02	43
2701	2	20	4	54	6	26	16	10	3	09	24	24
2801	7	26	23	14	6	27	56	20	3	09	46	04
2901	1	2	41	34	6	29	36	30	3	10	07	44
3001	6	8	59	55	7	01	16	40	3	10	29	25
4001	10	12	3	18	7	17	58	20	3	14	06	09
5001	2	15	6	40	8	04	40	00	3	17	42	53
6001	6	18	10	3	8	21	21	40	3	21	19	37
7001	10	21	13	25	9	08	03	20	3	24	56	21
8001	2	24	16	48	9	24	45	00	3	28	33	05

Months	Com. Y Lon. ♃			Biſſ. Year Longi. ♃			Aphe- ♃			No. Aſ. ♃		
	D	′	″	D	′	″	D	′	″	D	′	″
Januar.	0	0	0	00	00	00	0	0	00	0	0	0
Febru.	0	02	0	02	34	37	0	0	05	0	0	1
March	0	04	0	04	59	16	0	0	11	0	0	2
Aprill	[illegible]			07	33	53	0	0	16	0	0	3
May	0	09	0	10	03	31	0	0	21	0	0	4
June	0	12	0	12	38	08	0	0	26	0	0	5
July	0	15	0	15	07	46	0	0	31	0	0	6
Auguſt	0	17	0	17	42	23	0	0	37	0	0	7
Septẽb	0	20	0	20	17	01	0	0	42	0	0	8
Octob.	0	22	0	22	46	39	0	0	40	0	0	9
Nove.	0	25	0	25	21	16	0	0	51	0	0	10
Decem	0	27	0	27	50	54	0	0	56	0	0	11

[illegible] ♃

A Table of the Annuall Motion of ♃, for ſupplying the intermediate Yeares of the former Table.

	Years included.	Longitude of ♃				Aphelion of ♃				No. Aſc. ♃		
		S	D	′	″	S	D	′	″	D	′	″
	80	8	29	02	40	0	1	20	8	0	17	20
	60	0	21	47	00	0	1	00	6	0	13	0
	40	4	14	31	20	0	0	40	4	0	08	40
	20	8	07	15	40	0	0	20	2	0	04	20
	1	1	00	20	32	0	0	01	0	0	0	13
	2	2	00	41	04	0	0	02	0	0	0	22
	3	3	01	01	36	0	0	03	0	0	0	39
B	4	4	01	27	08	0	0	04	0	0	0	52
	5	5	01	47	40	0	0	05	0	0	1	5
	6	6	02	08	12	0	0	06	0	0	1	18
	7	7	02	28	44	0	0	07	1	0	1	31
B	8	8	02	54	16	0	0	08	1	0	1	44
	9	9	03	14	48	0	0	09	1	0	1	57
	10	10	03	35	20	0	0	10	1	0	2	10
	11	11	03	55	53	0	0	11	1	0	2	23
B	12	0	04	21	24	0	0	12	1	0	2	36
	13	1	04	41	56	0	0	13	1	0	2	49
	14	2	05	02	28	0	0	14	1	0	3	2
	15	3	05	23	01	0	0	15	1	0	3	15
B	16	4	05	48	32	0	0	16	1	0	3	28
	17	5	06	09	04	0	0	17	2	0	3	41
	18	6	06	29	37	0	0	18	2	0	3	54
	19	7	06	50	09	0	0	19	2	0	4	7
B	20	8	07	15	40	0	0	20	2	0	4	20

Dayes.	Longit. of ♃			H	Lon. ♃		H	Lonit. ♃	
	D	′	″	′	′	″	′	′	″
1	0	4	59	1	0	12	31	6	27
2	0	9	59	2	0	25	32	6	40
3	0	14	58	3	0	37	33	6	52
4	0	19	57	4	0	50	34	7	5
5	0	24	56	5	1	2	35	7	17
6	0	29	56	6	1	15	36	7	30
7	0	34	55	7	1	27	37	7	42
8	0	39	54	8	1	40	38	7	55
9	0	44	53	9	1	52	39	8	7
10	0	49	53	10	2	5	40	8	20
11	0	54	52	11	2	17	41	8	32
12	0	59	51	12	2	30	42	8	44
13	1	4	50	13	2	42	43	8	57
14	1	9	50	14	2	55	44	9	9
15	1	14	49	15	3	7	45	9	22
16	1	19	48	16	3	20	46	9	34
17	1	24	48	17	3	32	47	9	47
18	1	29	47	18	3	44	48	9	59
19	1	34	46	19	3	57	49	10	12
20	1	39	45	20	4	9	50	10	24
21	1	44	45	21	4	22	51	10	37
22	1	49	44	22	4	34	52	10	50
23	1	54	43	23	4	47	53	11	2
24	1	59	42	24	4	59	54	11	15
25	2	4	42	25	5	12	55	11	27
26	2	9	41	26	5	24	56	11	40
27	2	14	40	17	5	37	57	11	52
28	2	19	39	28	5	50	58	12	5
29	2	24	39	29	6	2	59	12	17
30	2	29	38	30	6	15	60	12	30
31	2	34	37	″	″	‴	″	″	‴

A Table of the abſolute Æquation of the firſt inequality of Jupiter.

Signe 0.

Degrees.	Anomalie co-æquated.				Æquati. ♃ Subſtract.			Diſtance of ♃ frō ⊙
	S	D	′	″	D	′	″	
0	0	0	0	0	0	0	0	547550
1	0	0	57	2	0	5	31	547546
2	0	1	54	4	0	11	1	547535
3	0	2	51	6	0	16	31	547516
4	0	3	48	8	0	22	3	547480
5	0	4	45	10	0	27	33	547458
6	0	5	42	13	0	33	2	547413
7	0	6	39	15	0	38	30	547371
8	0	7	36	18	0	43	59	547318
9	0	8	33	22	0	49	25	547259
10	0	9	30	27	0	54	49	547192
11	0	10	27	32	1	0	15	547119
12	0	11	24	38	1	5	31	547038
13	0	12	21	45	1	11	2	546952
14	0	13	18	53	1	16	23	546863
15	0	14	16	0	1	21	42	546765
16	0	15	13	9	1	27	1	546652
17	0	16	10	20	1	32	17	546537
18	0	17	7	31	1	37	33	546417
19	0	18	4	42	1	42	47	546291
20	0	19	1	55	1	47	59	546158
21	0	19	59	7	1	53	11	546013
22	0	20	56	22	1	58	20	545867
23	0	21	53	38	2	3	29	545713
24	0	22	50	55	2	8	34	545553
25	0	23	48	14	2	13	38	545384
26	0	24	45	35	2	18	38	545211
27	0	25	42	56	2	23	36	545035
28	0	26	40	20	1	28	31	544852
29	0	27	37	42	2	33	25	544661
30	0	28	35	9	2	38	17	544453
Anomal.					Adde.			

Signe 11.

Signe 1.

Anomalie co-æquated.				Æquati. ♃ Subſtract			Diſtanc♃ of ♃ frō ⊙	Degrees
S	D	′	″	D	′	″		
0	28	35	9	2	38	17	544453	30
0	29	32	36	2	43	4	544247	29
1	0	30	6	2	47	49	544043	28
1	1	27	37	2	52	33	543822	27
1	2	25	9	2	57	14	543595	26
1	3	22	44	3	1	53	543364	25
1	4	20	21	3	6	28	543176	24
1	5	18	0	3	11	0	542885	23
1	6	15	40	3	15	28	542639	22
1	7	13	29	3	19	54	542382	21
1	8	11	9	3	24	18	542127	20
1	9	8	56	3	28	36	541864	19
1	10	7	45	3	32	53	541592	18
1	11	4	37	3	37	5	541315	17
1	12	2	30	3	41	14	541033	16
1	13	0	25	3	45	22	540744	15
1	13	58	23	3	49	24	540452	14
1	14	56	23	3	53	21	540157	13
1	15	54	25	3	57	16	539852	12
1	16	52	30	4	1	7	539544	11
1	17	50	36	4	4	54	539232	10
1	18	48	45	4	8	38	538914	9
1	19	46	57	4	12	16	538590	8
1	20	45	11	4	15	52	538260	7
1	21	43	29	4	19	23	537920	6
1	22	41	49	4	22	50	537587	5
1	23	40	11	4	26	12	537240	4
1	24	38	36	4	29	30	536892	3
1	25	37	4	4	32	42	536540	2
1	26	35	34	4	35	51	536182	1
1	27	34	9	4	38	54	635819	0
				Adde.				Anomal.

Signe 10.

A Table of the abſolute Æquation of the firſt inequality of Jupiter.

Signe 2.

Degrees.	Anomalie co-æquated. S	D	′	″	Æquati. ♃ *Subſtract.* D	′	″	Diſtance of ♃ frō ☉
0	1	27	34	9	4	38	54	535819
1	1	28	22	44	4	41	53	535455
2	1	29	31	25	4	44	49	535080
3	2	0	30	7	4	47	40	534709
4	2	1	28	52	4	50	26	534330
5	2	2	27	39	4	53	7	533947
6	2	3	26	29	4	55	42	533563
7	2	4	25	23	4	58	14	533171
8	2	5	24	20	5	0	41	532783
9	2	6	23	18	5	3	3	532389
10	2	7	22	20	5	5	19	531992
11	2	8	21	25	5	7	31	531592
12	2	9	20	32		9	38	531189
13	2	10	19	44		11	38	530773
14	2	11	18	58		13	35	530365
15	2	12	18	14		15	26	529954
16	2	13	17	34	5	17	11	529542
17	2	14	16	58		18	49	529121
18	2	15	16	24		20	25	528699
19	2	16	15	52		21	56	528277
20	2	17	15	26		23	19	527849
21	2	18	15	1	5	24	33	527413
22	2	19	14	39		25	44	526996
23	2	20	14	20		26	48	526564
24	2	21	14	3		27	48	526132
25	2	22	13	50		28	43	525706
26	2	23	13	40	5	29	30	525271
27	2	24	13	34		30	12	524831
28	2	25	13	31		30	49	524381
29	2	26	13	31		31	19	523937
30	2	27	13	34	5	31	45	523492

Adde.

Anomal. Signe 9.

Signe 3.

Anomalie co-æquated. S	D	′	″	Æquati. ♃ *Subſtract* D	′	″	Diſtance of ♃ frō ☉	Degrees
2	27	13	34	5	31	45	523530	30
2	28	13	40		32	1	523089	29
2	29	13	49		32	12	522645	28
3	0	14	0		32	18	522202	27
3	1	14	15		32	18	521758	26
3	2	14	34		32	12	521314	25
3	3	14	55	5	32	0	520868	24
3	4	15	19		31	41	520422	23
3	5	15	47		31	17	519977	22
3	6	16	17		30	46	519533	21
3	7	16	50		30	8	519089	20
3	8	17	24	5	29	25	518647	19
3	9	18	4		28	35	518208	18
3	10	18	46		27	38	517772	17
3	11	19	31		26	37	517484	16
3	12	20	19		25	28	516904	15
3	13	21	11	5	24	15	516475	14
3	14	22	4		22	52	516042	13
3	15	23	0		21	25	515606	12
3	16	23	[illegible]		19	50	515178	11
3	17	25	1		18	9	514748	10
3	18	26	5	5	16	26	514321	9
3	19	27	13		14	35	513900	8
3	20	28	22		12	34	513479	7
3	21	29	34		10	30	513062	6
3	22	30	50		8	20	512645	5
3	23	32	8	5	6	3	512236	4
3	24	33	29	5	3	41	511826	3
3	25	34	53	5	1	11	511416	2
3	26	36	19	4	58	37	511011	1
3	27	37	46	4	55	57	510611	0

Adde.

Signe 8. Anomal.

A Table of the abſolute Æquation of the firſt inequality of Jupiter.

Signe 4.

Degrees.	Anomalie co-æquated. S	D	′	″	Æquati. ♃ Subſtract D	′	″	Diſtance of ♃ frō ☉
0	3	27	37	46	4	55	57	510611
1	3	28	39	16	4	53	11	512114
2	3	29	40	49	4	50	18	509820
3	4	0	42	25	4	47	19	509430
4	4	1	44	3	4	44	14	509043
5	4	2	45	45	4	41	3	508661
6	4	3	47	28	4	37	47	508278
7	4	4	49	13	4	34	25	507903
8	4	5	51	1	4	30	59	507535
9	4	6	52	51	4	27	27	507170
10	4	7	54	44	4	23	50	506809
11	4	8	56	39	4	20	7	506452
12	4	9	58	35	4	16	20	506102
13	4	11	0	33	4	12	26	505754
14	4	12	2	32	4	8	28	505416
15	4	13	4	33	4	4	26	505081
16	4	14	6	38	4	0	19	504751
17	4	15	8	43	3	56	3	504423
18	4	16	10	52	3	51	44	504109
19	4	17	13	2	3	47	20	503779
20	4	18	15	13	3	42	50	503489
21	4	19	17	26	3	38	16	503188
22	4	20	19	42	3	33	37	502893
23	4	21	22	0	3	28	53	502601
24	4	22	24	20	3	24	5	502320
25	4	23	26	40	3	19	13	502048
26	4	24	29	3	3	14	18	501780
27	4	25	31	27	3	9	19	501517
28	4	26	33	53	3	4	17	501262
29	4	27	36	19	3	59	10	501014
30	4	28	38	47	3	53	59	500773
Anomal.	Adde.							

Signe 7.

Signe 5.

Anomalie co-æquated. S	D	′	″	Æquati. ♃ Subſtract D	′	″	Diſtance of ♃ frō ☉	Degrees
4	28	38	47	2	53	59	500773	30
4	29	41	14	2	48	46	500539	29
5	0	43	47	2	43	30	590311	28
5	1	46	19	2	38	11	500092	27
5	2	48	52	2	32	45	499877	26
5	3	51	27	2	27	17	499671	25
5	4	54	2	2	21	47	499474	24
5	5	56	38	2	16	16	499280	23
5	6	59	16	2	10	40	499097	22
5	8	1	54	2	5	2	498924	21
5	9	4	34	1	59	18	498756	20
5	10	7	15	1	53	35	498594	19
5	11	9	56	1	47	49	498444	18
5	12	12	38	1	42	0	498297	17
5	13	15	21	1	36	10	498155	16
5	14	18	4	1	30	19	498024	15
5	15	20	50	1	24	24	497909	14
5	16	23	35	1	18	30	497800	13
5	17	26	20	1	12	34	497690	12
5	18	29	5	1	6	36	497597	11
5	19	31	52	1	0	37	497508	10
5	20	35	39	0	54	36	497428	9
5	21	37	26	0	48	35	497359	8
5	22	40	15	0	42	32	497296	7
5	23	43	4	0	36	30	497241	6
5	24	45	52	0	30	26	497192	5
5	25	48	42	0	24	21	497157	4
5	26	51	32	0	18	16	497128	3
5	27	54	21	0	12	11	497106	2
5	28	57	10	0	6	6	497095	1
6	0	0	0	0	0	0	497090	0.
Adde.								Anomal.

Signe 6.

A Table of the Inclination, Reduction, and Curtation, of JUPITER,

Argument of Latitude.

North Signe 0. South Signe 6.				*Signe* 1. *Signe* 7.				*Segne* 2. *Signe* 8,				S. 0. S. 6.		S. 1. S. 7.		S. 2. S. 8.		S. 0 S. 6	S. 1. S. 7.	S. 2. S. 8.	N- ort
Degres	Inclination.			Inclination.				Inclination.				Reduction.						Curtation.			Degres
	Parts	′	″	Parts	D	′	″	Parts	D	′	″	′	″	′	″	′	″	Pa	Part	Part	
0	0	0	0	6212	0	40	55	10760	1	10	52	0	0	0	25	0	25	0	38	110	30
1	219	1	26	6399	0	42	9	10866	1	11	34	0	2	0	26	0	25	0	40	112	29
2	434	2	51	6584	0	43	22	10970	1	12	15	0	3	0	26	0	24	0	42	115	28
3	650	4	17	6767	0	44	34	11068	1	12	55	0	4	0	27	0	24	0	45	117	27
4	867	5	42	6947	0	45	46	11167	1	13	33	0	5	0	27	0	23	0	47	119	26
5	1083	7	8	7126	0	46	58	11260	1	14	10	0	6	0	27	0	23	1	49	121	25
6	1298	8	33	7303	0	48	6	11350	1	14	45	0	7	0	28	0	22	1	52	123	24
7	1514	9	58	7477	0	49	14	11436	1	15	19	0	8	0	28	0	22	2	54	125	23
8	1729	11	23	7649	0	50	23	11519	1	15	52	0	9	0	28	0	21	3	57	127	22
9	1944	12	48	7819	0	51	30	11599	1	16	23	0	10	0	28	0	20	4	59	129	21
10	2157	14	12	7986	0	52	36	11675	1	16	54	0	11	0	29	0	20	5	62	131	20
11	2370	15	37	8151	0	53	41	11747	1	17	23	0	12	0	29	0	19	6	64	132	19
12	2583	17	0	8313	0	54	46	11816	1	17	50	0	13	0	29	0	18	7	67	134	18
13	2795	18	24	8473	0	55	49	11881	1	18	16	0	14	0	29	0	17	8	69	135	17
14	3006	19	48	8630	0	56	52	11943	1	18	40	0	15	0	29	0	16	9	71	136	16
15	3215	21	11	8785	0	57	52	12001	1	19	2	0	15	0	30	0	15	10	74	138	15
16	3424	22	33	8937	0	58	53	12055	1	19	24	0	16	0	29	0	15	12	77	139	14
17	3632	23	56	9086	0	59	52	12103	1	19	44	0	17	0	29	0	14	13	79	140	13
18	3839	25	17	9233	1	0	49	12152	1	20	3	0	18	0	29	0	13	14	81	141	12
19	4045	26	39	9371	1	1	45	12196	1	20	20	0	18	0	29	0	12	16	84	142	11
20	4249	27	59	9517	1	2	41	12235	1	20	37	0	19	0	29	0	11	17	86	143	10
21	4452	29	20	9655	1	3	36	12271	1	20	49	0	20	0	28	0	10	19	89	144	9
22	4654	30	39	6790	1	4	29	12303	1	21	1	0	21	0	28	0	9	21	91	145	8
23	4854	31	59	9922	1	5	21	12331	2	21	12	0	21	0	28	0	8	23	94	146	7
24	5053	33	17	10056	1	6	12	12359	1	21	22	0	22	0	28	0	7	25	96	147	6
25	5251	34	35	10177	1	7	2	12377	1	21	31	0	23	0	27	0	6	27	99	147	5
26	5446	35	53	10300	1	7	50	12394	1	21	38	0	23	0	27	0	5	29	101	148	4
27	5640	37	9	10420	1	8	37	12407	1	21	43	0	24	0	27	0	4	31	103	148	3
28	5833	38	26	10536	1	9	24	1241[illegible]	1	21	47	0	24	0	26	0	3	33	106	148	2
29	6023	39	41	10649	1	10	8	12422	1	21	49	0	25	0	26	0	2	36	108	148	1
30	6212	40	55	10760	1	10	52	1242[illegible]	1	21	50	0	25	0	25	0	0	38	110	148	0
North *Signe* 5. South *Signe* 11				*Signe* 4. *Signe* 10.				*Signe* 3. *Signe* 9.				S. 5. S. 11.		S. 4. S. 10.		S. 3. S. 9.		S. 5 S 1	S. 4. S. 10.	S. 3. S 9.	Agre.

Argument of Latitude.

A Table of the Middle Motion of MARS, for Yeares of the Chriſtian Æra, according to the Julian Account.

Yeares of Chriſt.	Longitude of ♂ S D ′ ″	Aphelion of ♂. S D ′ ″	Nod. Aſcen. ♂. S D ′ ″
001	1 10 07 42	3 26 35 57	0 27 20 31
101	3 11 47 33	3 28 37 27	0 28 33 12
201	5 13 27 23	4 00 38 57	0 29 45 54
301	7 15 07 13	4 02 40 27	1 00 58 35
401	9 16 47 03	4 04 41 58	1 02 11 16
501	11 18 26 53	4 06 43 28	1 03 23 57
601	1 20 06 43	4 08 44 58	1 04 36 38
701	3 21 46 34	4 10 46 28	1 05 49 19
801	5 23 26 24	4 12 47 58	1 07 02 01
901	7 25 06 14	4 14 49 29	1 08 14 42
1001	9 26 46 04	4 16 50 59	1 09 27 23
1101	11 28 25 54	4 18 52 29	1 10 40 04
1201	2 00 05 44	4 20 53 59	1 11 52 45
1301	4 01 45 35	4 22 55 29	1 13 05 26
1401	6 03 25 25	4 24 57 00	1 14 18 08
1501	8 05 05 15	4 26 58 30	1 15 30 49
1601	10 06 45 05	4 29 00 00	1 16 43 30
1701	0 08 24 55	5 01 01 30	1 17 56 11
1801	2 10 04 45	5 03 03 00	1 19 08 52
1901	4 11 44 35	5 05 04 31	1 20 21 33
2001	6 13 24 26	5 07 06 01	1 21 34 15
2101	8 15 04 16	5 09 07 31	1 22 46 56
2201	10 16 44 06	5 11 09 01	1 23 59 37
2301	0 18 23 56	5 13 10 31	1 25 12 18
2401	2 20 03 46	5 15 12 02	1 26 24 59
2501	4 21 43 36	5 17 13 32	1 27 37 40
2601	6 23 23 27	5 19 15 02	1 28 50 22
2701	8 25 03 17	5 21 16 32	2 00 03 03
2801	10 26 43 07	5 23 18 02	2 01 15 44
2901	0 28 22 57	5 25 19 33	2 02 28 25
3001	3 00 02 47	5 27 21 03	2 03 41 06
4001	11 16 41 09	6 17 36 05	2 15 47 57
5001	8 03 19 31	7 07 51 07	2 27 54 48
6001	4 19 57 52	7 28 06 09	3 10 01 39
7001	1 06 36 14	8 18 21 11	3 22 08 30
8001	9 23 14 36	9 08 36 13	4 04 15 21

Months	Com. Year Lon. ♂ S D ′ ″	Biſſ. Year Longi. ♂ S D ′ ″	Aph. ♂ ′ ″	N. Aſ ♂ ′ ″
Januar.	0 00 00 00	0 00 00 00	0 00	0 00
Febru.	0 16 14 46	0 16 14 46	0 06	0 03
March	1 00 55 13	1 01 26 19	0 12	0 7
Aprill	1 17 09 59	1 17 41 26	0 18	0 10
May	2 02 53 18	2 03 24 45	0 24	0 14
June	2 19 08 05	2 19 39 32	0 31	0 17
July	3 04 51 24	3 05 22 50	0 37	0 21
Auguſt	3 21 06 11	3 21 37 37	0 43	0 25
Septēb	4 07 20 57	4 07 52 23	0 49	0 28
Octob.	4 23 04 16	4 23 35 42	0 55	0 32
Nove.	5 09 19 03	5 09 50 29	1 01	0 36
Decem	5 25 02 22	5 25 33 48	1 07	0 39

A Table of the Annuall Motion of ♂ for ſupplying of the intermediate Years of the former Table.

	Years included.	Longitude of ♂ S D ′ ″	Aphelion of ♂ S D ′ ″	Node Aſc. ♂. S D ′ ″
	80	6 13 19 52	0 1 37 12	0 0 58 08
	60	10 24 59 54	0 1 12 54	0 0 43 36
	40	3 06 39 56	0 0 48 36	0 0 29 04
	20	7 18 19 58	0 0 24 18	0 0 14 32
	1	6 11 17 08	0 0 01 13	0 0 00 43
	2	0 22 34 16	0 0 02 26	0 0 01 27
	3	7 3 51 25	0 0 03 38	0 0 02 11
B	4	1 15 40 00	0 0 04 52	0 0 02 55
	5	7 26 57 07	0 0 06 05	0 0 03 38
	6	2 08 14 16	0 0 07 17	0 0 04 22
	7	8 19 31 23	0 0 08 30	0 0 05 06
B	8	3 01 20 00	0 0 09 43	0 0 05 49
	9	9 12 37 08	0 0 10 56	0 0 06 33
	10	3 23 54 16	0 0 12 09	0 0 07 16
	11	10 05 11 24	0 0 13 22	0 0 08 00
B	12	4 16 59 59	0 0 14 35	0 0 08 43
	13	10 28 17 07	0 0 15 48	0 0 09 27
	14	5 9 34 15	0 0 17 01	0 0 10 11
	15	11 20 51 23	0 0 18 14	0 0 10 54
B	16	6 02 39 51	0 0 19 26	0 0 11 38
	17	0 13 57 7	0 0 20 39	0 0 12 21
	18	6 25 14 15	0 0 21 52	0 0 13 05
	19	1 06 31 23	0 0 23 05	0 0 13 48
B	20	7 18 19 58	0 0 24 18	0 0 14 32

Dayes.	Longit. of ♂ D ′ ″	H ′	Lon. of ♂ ′ ″	H ′	Long. ♂ D ′ ″
1	0 31 27	1	1 19	31	0 40 37
2	1 02 53	2	2 37	32	0 41 56
3	1 34 20	3	3 56	33	0 43 15
4	2 05 46	4	5 15	34	0 44 33
5	2 37 16	5	6 33	35	0 45 52
6	3 8 40	6	7 52	36	0 47 10
7	3 40 06	7	9 10	37	0 48 29
8	4 11 33	8	10 29	38	0 49 48
9	4 43 00	9	11 48	39	0 51 6
10	5 14 27	10	13 6	40	0 52 25
11	5 45 53	11	14 25	41	0 53 43
12	6 17 20	12	15 43	42	0 55 2
13	6 48 46	13	17 2	43	0 56 21
14	7 20 14	14	18 21	44	0 57 39
15	7 51 40	15	19 39	45	0 58 58
16	8 23 6	16	20 58	46	1 0 16
17	8 54 33	17	22 16	47	1 1 35
18	9 26 0	18	23 35	48	1 2 54
19	9 57 27	19	24 54	49	1 4 12
20	10 28 53	20	26 12	50	1 5 31
21	11 00 20	21	27 31	51	1 6 49
22	11 31 46	22	28 49	52	1 8 8
23	12 03 13	23	30 8	53	1 10 27
24	12 34 40	24	31 27	54	1 11 45
25	13 06 6	25	32 45	55	1 13 4
26	13 37 33	26	34 4	56	1 14 22
27	14 09 0	27	35 22	57	1 15 41
28	14 40 27	28	36 41	58	1 17 0
29	15 11 5	29	38 0	59	1 18 19
30	15 43 20	30	39 18	60	1 19 37
31	16 14 46				

11 H1

A Table of the abſolute Æquation of the firſt inequality of Mars.

Signe 0.

Degrees	Anomalie co-æquated.				Æquati. ♂ Subſtract.			Diſtance of ♂ from ☉.
	S	D	′	″	D	′	″	
0	0	0	0	0	0	0	0	166605
1	0	0	54	6	0	10	4	166602
2	0	1	48	13	0	20	8	166597
3	0	2	42	21	0	30	11	166585
4	0	3	36	28	0	40	14	166572
5	0	4	30	35	0	50	16	166557
6	0	5	24	43	1	0	16	166537
7	0	6	18	52	1	10	14	166513
8	0	7	13	1	1	20	10	166487
9	0	8	7	11	1	30	4	166456
10	0	9	1	23	1	39	57	166423
11	0	9	55	46	1	49	49	166384
12	0	10	49	50	1	59	38	166344
13	0	11	44	6	2	9	25	166299
14	0	12	38	24	2	19	9	166248
15	0	13	32	43	2	28	50	166194
16	0	14	27	3	2	38	29	166139
17	0	15	21	25	2	48	5	166088
18	0	16	15	50	2	57	39	166014
19	0	17	10	17	3	7	10	165948
20	0	18	4	44	3	16	37	165877
21	0	18	59	18	3	26	2	165803
22	0	19	53	51	3	35	25	165725
23	0	20	48	27	3	44	45	165646
24	0	21	43	5	3	54	1	165561
25	0	22	37	49	3	3	12	165473
26	0	23	32	34	4	12	19	165380
27	0	24	27	21	4	21	24	165283
28	0	25	22	12	4	30	25	165184
29	0	26	17	4	4	39	23	165081
30	0	27	12	0	4	48	17	164977

Anomal. *Adde.*

Signe 11.

Signe 1.

Anomalie co-æquated.				Æquati. ♂ Subſtract.			Diſtance of ♂ from ☉.	Degrees.
S	D	′	″	D	′	″		
0	27	12	0	4	48	17	164977	30
0	28	7	2	4	57	6	164867	29
0	29	2	6	5	5	51	164752	28
0	29	57	13	5	14	32	164636	27
1	0	52	25	5	23	8	164518	26
1	1	47	39	5	31	39	164398	25
1	2	42	58	5	40	7	164274	24
1	3	38	21	5	48	31	164144	23
1	4	33	49	5	56	50	164012	22
1	5	29	20	6	5	4	163875	21
1	6	24	55	6	13	12	163738	20
1	7	20	36	6	21	14	163597	19
1	8	16	20	6	29	13	163452	18
1	9	12	8	6	37	8	163305	17
1	10	7	59	6	45	0	163144	16
1	11	3	55	6	52	44	163000	15
1	11	59	54	7	0	19	162841	14
1	12	55	57	7	7	47	162681	13
1	13	52	0	7	15	10	162518	12
1	14	48	28	7	22	28	162352	11
1	15	44	57	7	29	42	162181	10
1	16	41	29	7	36	50	162009	9
1	17	38	7	7	43	52	161834	8
1	18	34	50	7	50	47	161655	7
1	19	31	38	7	57	36	161477	6
1	20	28	28	8	4	19	161295	5
1	21	25	21	8	10	57	161108	4
1	22	22	20	8	17	25	160921	3
1	23	19	23	8	23	46	160730	2
1	24	16	32	8	29	59	160536	1
1	25	13	46	8	36	7	160340	0

Adde. Anomal.

Signe 10.

A Table of the abſolute Æquation of the firſt inequality of Mars.

	Signe 2.			Signe 3.			
Degrees	Anomalie co-æquated. S D ′ ″	Æquati. ♂ *Subſtract.* D ′ ″	Diſtance of ♂ from ☉.	Anomalie co-æquated. S D ′ ″	Æquati. ♂ *Subſtract.* D ′ ″	Diſtance of ♂ from ☉.	Degrees.
0	1 25 13 46	8 36 7	160340	2 24 38 42	10 33 15	153550	30
1	1 26 11 8	8 42 7	160143	2 25 39 0	10 34 33	153304	29
2	1 27 8 37	8 48 0	159942	2 26 39 37	10 35 38	153057	28
3	1 28 6 11	8 53 45	159738	2 27 40 14	10 36 32	152810	27
4	1 29 3 51	8 59 22	159533	2 28 40 56	10 37 15	152562	26
5	2 0 1 37	9 4 52	159326	2 29 41 44	10 37 45	152316	25
6	2 0 59 28	9 10 14	159114	3 0 42 38	10 38 4	152070	24
7	2 1 57 27	9 15 27	158902	3 1 43 38	10 38 15	151818	23
8	2 2 55 32	9 20 31	158688	3 2 44 44	10 38 11	151569	22
9	2 3 53 43	9 25 30	158473	3 3 45 56	10 37 56	151318	21
10	2 4 51 59	9 30 20	158253	3 4 47 14	10 37 29	151069	20
11	2 5 50 19	9 35 0	158032	3 5 48 36	10 36 46	150819	19
12	2 6 48 46	9 39 32	157816	3 6 50 4	10 35 50	150568	18
13	2 7 47 21	9 43 55	157585	3 7 51 38	10 34 42	150318	17
14	2 8 46 3	9 48 9	157359	3 8 53 18	10 33 23	150070	16
15	2 9 44 49	9 52 13	157130	3 9 55 4	10 31 50	149822	15
16	2 10 43 40	9 56 8	156899	3 10 56 54	10 30 7	149577	14
17	2 11 42 39	9 59 53	156669	3 11 58 49	10 28 10	149331	13
18	2 12 41 43	10 3 28	156436	3 13 0 50	10 25 58	149085	12
19	2 13 40 55	10 6 53	156206	3 14 2 57	10 23 34	148841	11
20	2 14 40 13	10 10 9	155970	3 15 5 10	10 20 58	148599	10
21	2 15 39 36	10 13 15	155732	3 16 7 26	10 18 8	148357	9
22	2 16 39 6	10 16 12	155491	3 17 9 48	10 15 7	148116	8
23	2 17 38 41	10 18 57	155252	3 18 12 15	10 11 52	147876	7
24	2 18 38 22	10 21 32	155011	3 19 14 47	10 8 24	147630	6
25	2 19 38 11	10 23 55	154773	3 20 17 24	10 4 41	147397	5
26	2 20 38 5	10 26 9	154529	3 21 20 5	10 0 45	147164	4
27	2 21 38 6	10 28 12	154284	3 22 22 50	9 56 38	146934	3
28	2 22 38 12	10 30 3	154038	3 23 25 41	9 52 17	146697	2
29	2 23 38 23	10 31 45	153793	3 24 28 36	9 47 44	146459	1
30	2 24 38 42	10 33 15	153550	3 25 31 34	9 42 56	146227	0
Anomal.		*Adde.*			*Adde.*		Anoma
	Signe 9.			Signe 8.			

A Table of the abſolute Æquation of the firſt inequality of Mars.

Signe 4.

Degrees	Anomalie co-æquated.				Æquati. ♂ *Subſtract.*			Diſtance of ♂ from ☉.
	S	D	′	″	D	′	″	
0	3	25	31	34	9	42	56	146227
1	3	26	34	37	9	37	56	145996
2	3	27	37	45	9	32	43	145771
3	3	28	40	58	9	27	19	145549
4	3	29	44	16	9	21	42	145329
5	4	0	47	39	9	15	52	145106
6	4	1	51	4	9	9	49	144887
7	4	2	54	31	9	3	33	144672
8	4	3	58	3	8	57	6	144459
9	4	5	1	39	8	50	26	144249
10	4	6	5	21	8	43	36	144040
11	4	7	9	6	8	36	33	143834
12	4	8	12	55	8	29	19	143632
13	4	9	16	45	8	21	53	143431
14	4	10	20	39	8	14	15	143235
15	4	11	24	37	8	6	25	143042
16	4	12	28	39	7	58	25	142851
17	4	13	32	45	7	50	12	142662
18	4	14	36	51	7	41	50	142477
19	4	15	41	0	7	33	16	142297
20	4	16	45	13	7	24	32	142118
21	4	17	49	29	7	15	37	141943
22	4	18	53	49	7	6	34	141773
23	4	19	58	11	6	57	22	141605
24	4	21	2	39	6	47	57	141444
25	4	22	7	4	6	38	23	141284
26	4	23	11	33	6	28	42	141127
27	4	24	16	3	6	18	51	140975
28	4	25	20	39	6	8	51	140826
29	4	26	25	17	5	58	42	140684
30	4	27	29	56	5	48	26	140543
Anomal.					*Adde.*			

Signe 7.

Signe 5.

Anomalie co-æquated.				Æquati. ♂ *Subſtract.*			Diſtance of ♂ from ☉.	Degrees.
S	D	′	″	D	′	″		
4	27	29	56	5	48	26	140543	30
4	28	34	36	5	38	1	140407	29
4	29	39	14	5	27	30	140275	28
5	0	44	2	5	16	52	140145	27
5	1	48	49	4	6	5	140021	26
5	2	53	38	4	55	11	139902	25
5	3	58	28	4	44	11	139786	24
5	5	3	20	4	33	5	139676	23
5	6	8	12	4	21	55	139568	22
5	7	13	7	4	10	39	139465	21
5	8	18	1	3	59	17	139366	20
5	9	23	1	3	47	47	139272	19
5	10	28	0	3	36	11	139184	18
5	11	32	59	3	24	34	139099	17
5	12	39	0	3	12	52	139020	16
5	13	43	2	3	1	4	138945	15
5	14	48	6	2	49	14	138875	14
5	15	53	10	2	37	20	138809	13
5	16	58	16	2	25	22	138747	12
5	18	3	22	2	13	22	138692	11
5	19	8	27	2	1	22	138641	10
5	20	13	34	1	49	22	138598	9
5	21	18	43	1	37	17	138564	8
5	22	23	52	1	25	9	138532	7
5	23	29	1	1	13	0	138506	6
5	24	34	10	1	0	50	138484	5
5	25	39	20	0	48	40	138465	4
5	26	44	30	0	36	30	138448	3
5	27	49	39	0	24	21	138429	2
5	28	54	49	0	12	11	138412	1
6	0	0	0	0	0	0	138395	0
				Adde.				Anoma.

Signe 6.

Tabula Æquationis *Martis Tychonica*.

Degrees	Signe 0. Subſtract.			Signe 1. Subſtract.			Signe 2 Subſtract.			Signe 3. Subſtract.			Signe 4 Subſtract.			Signe 5 Subſtract.			Degrees
	D	′	″	D	′	″	D	′	″	D	′	″	D	′	″	D	′	″	
0	0	0	0	4	48	44	8	38	52	10	32	46	9	41	54	5	52	51	30
1	0	9	57	4	57	37	8	45	47	10	33	55	9	37	6	5	42	31	29
2	0	19	54	5	6	30	8	50	41	10	34	57	9	32	3	5	32	3	28
3	0	29	50	5	15	20	8	56	24	10	35	43	9	26	50	5	21	27	27
4	0	39	46	5	24	4	9	2	4	10	36	20	9	21	22	5	10	44	26
5	0	49	43	5	32	44	9	7	28	10	36	43	9	15	45	4	59	28	25
6	0	59	39	5	41	15	9	12	46	10	36	57	9	10	2	4	48	55	24
7	1	9	34	5	49	47	9	17	54	10	36	57	9	3	43	4	37	50	23
8	1	19	27	5	58	16	9	22	49	10	36	51	8	57	27	4	26	36	22
9	1	29	19	6	6	43	9	27	45	10	36	43	8	51	3	4	15	19	21
10	1	39	10	6	15	1	9	32	28	10	35	55	8	44	26	4	3	52	20
11	1	49	0	6	23	9	9	37	2	10	34	56	8	37	34	3	52	20	19
12	1	58	49	6	31	13	9	41	26	10	33	56	8	30	27	3	40	41	18
13	2	8	37	6	39	10	9	45	41	10	32	52	8	23	19	3	28	58	17
14	2	18	22	6	47	4	9	49	47	10	31	33	8	15	54	3	17	8	16
15	2	28	4	6	54	50	9	53	42	10	30	1	8	8	8	3	5	15	15
16	2	37	45	7	2	30	9	57	38	10	28	16	8	0	19	2	53	13	14
17	2	47	26	7	10	5	10	1	18	10	26	22	7	52	21	2	41	13	13
18	2	57	2	7	17	31	10	4	43	10	24	13	7	44	10	2	29	7	12
19	3	6	37	7	25	8	10	8	0	10	21	50	7	35	51	2	16	57	11
20	3	16	8	7	32	12	10	11	8	10	19	16	7	28	46	2	4	42	10
21	3	25	36	7	39	22	10	14	6	10	16	28	7	18	39	1	52	23	9
22	3	35	55	7	46	25	10	16	54	10	13	28	7	9	48	1	40	0	8
23	3	44	28	7	53	28	10	19	29	10	10	43	7	0	47	1	27	34	7
24	3	53	50	8	0	28	10	21	58	10	6	54	6	51	36	1	15	7	6
25	4	3	7	8	7	19	10	24	11	10	3	17	6	42	14	1	2	40	5
26	4	12	24	8	13	42	10	26	16	9	59	15	6	32	41	0	50	11	4
27	4	21	36	8	20	11	10	28	10	9	55	12	6	23	2	0	37	39	3
28	4	30	21	8	26	32	10	29	53	9	50	59	6	13	12	0	25	6	2
29	4	39	43	8	32	36	10	31	25	9	46	33	6	3	9	0	12	34	1
30	4	48	44	8	38	52	10	32	46	9	41	56	5	52	51	0	0	0	0
Ano	Adde, Signe 11			Adde. Signe 10			Adde Signe 9			Adde Signe 8			Adde Signe 7			Adde Signe 6			Ano

Let it not ſeem ſtrange to any, that I have added this Table of the Æquation of the firſt Inæquality of ♂, having before inſerted a Table agreeing to my own Obſervations and Hypotheſis (which by many vigilant Obſervations, I have always found to point out the place of ♂ moſt accurately, as well in his accronicall poſitures, as at other times) but becauſe to ſome it may perhaps be thought, though not altogether conſentaneous to ſome few of *Tycho's* Obſervations (for my part, I much ſuſpect the verity of them, becauſe other Obſervations made ſince his time, in the ſame Achronicall-Phaſes ſeem to contradict) I have for their ſatisfaction compoſed this latter, wherein I have not digreſſed from the Hypotheſis of the third Book, onely have varied from the Doctrine there delivered, in finding the Excentrique Æquation, as I ſhall demonſtrate in my intended Epitomie, where happily I may ſhew the Compoſition thereof. But as for the Anomaly co-æquate, and diſtance of ♂ from the Sun, they will co-incidere with the former Table of the Æquation of ♂, which is compoſed by my own Obſervations, according to the Doctrine delivered in the third Book, as is ſaid above.

A Table of the Inclination, Reduction, and Curtation, of MARS.

Argument of Latitude.

North } *Signe* 0. South } *Signe* 6.				*Signe* 1. *Signe* 7.				*Signe* 2. *Signe* 8.				S. 0. S. 6.		S. 1 S. 7.		S. 2. S. 8.		S.0 S.6	S. 1. S. 7.	S.2. S.8.	N- ort
Degres	Inclination.			Inclination.				Inclination.				Reduction.						Curtation.			Degres
	Parts.	'	"	Parts	D	'	"	Parts	D	'	"	'	"	'	"	'	"	Pa	Part	Part	
0	0	0	0	2458	0	55	32	4257	1	36	11	0	0	0	47	0	47	0	20	60	30
1	86	1	56	2532	0	57	11	4300	1	37	8	0	1	0	48	0	46	0	21	61	29
2	172	3	53	2605	0	58	50	4341	1	38	3	0	3	0	48	0	45	0	22	62	28
3	257	5	48	2678	1	0	27	4380	1	38	58	0	5	0	49	0	44	0	23	64	27
4	343	7	44	2749	1	2	4	4419	1	39	50	0	7	0	49	0	43	0	25	65	26
5	428	9	40	2820	1	3	40	4456	1	40	40	0	9	0	49	0	42	1	26	66	25
6	514	11	36	2890	1	5	15	4491	1	41	29	0	11	0	50	0	41	1	27	67	24
7	599	3	32	2959	1	6	48	4525	1	42	15	0	13	0	50	0	39	1	29	68	23
8	684	15	27	3027	1	8	21	4558	1	42	59	0	15	0	51	0	38	2	30	69	22
9	769	17	22	3094	1	9	52	4589	1	43	42	0	16	0	51	0	37	2	31	70	21
10	854	19	17	3160	1	11	23	4619	1	44	22	0	18	0	52	0	36	3	33	71	20
11	938	21	12	3225	1	12	52	4648	1	45	0	0	20	0	52	0	34	3	34	72	19
12	1022	23	6	3289	1	14	20	4675	1	45	37	0	22	0	52	0	33	4	36	72	18
13	1106	24	59	3353	1	15	46	4701	1	46	13	0	24	0	52	0	32	4	37	73	17
14	1189	26	52	3415	1	17	1	4726	1	46	46	0	26	0	53	0	30	5	38	74	16
15	1272	28	45	3476	1	18	34	4748	1	47	17	0	28	0	53	0	28	5	40	75	15
16	1355	30	36	3536	1	19	55	4770	1	47	46	0	30	0	53	0	26	6	42	75	14
17	1418	32	28	3595	1	21	14	4790	1	48	13	0	32	0	53	0	24	7	43	76	13
18	1519	34	19	3653	1	22	32	4809	1	48	39	0	33	0	52	0	22	8	44	77	12
19	1600	36	10	3710	1	23	50	4826	1	49	2	0	34	0	52	0	20	8	46	77	11
20	1681	37	59	3766	1	25	5	4841	1	49	23	0	36	0	52	0	18	9	47	78	10
21	1762	39	48	3820	1	26	19	485	1	49	42	0	37	0	51	0	16	10	49	78	9
22	1842	41	36	3874	1	27	31	4868	1	49	59	0	38	0	51	0	15	11	50	78	8
23	1921	43	23	3926	1	28	42	4879	1	50	14	0	39	0	50	0	13	12	51	79	7
24	2000	45	10	3977	1	29	51	488	1	50	27	0	41	0	50	0	11	13	53	79	6
25	2078	46	55	4027	1	30	59	4897	1	50	38	0	42	0	49	0	9	14	54	79	5
26	2155	48	40	4075	1	32	4	4904	1	50	47	0	43	0	49	0	7	15	55	80	4
27	2232	50	25	4123	1	33	8	4909	1	50	54	0	44	0	49	0	5	16	57	80	3
28	2308	52	8	4169	1	34	11	4913	1	50	59	0	45	0	48	0	3	18	58	80	2
29	2383	53	50	4214	1	35	11	4915	1	51	2	0	46	0	48	0	1	19	59	80	1
30	2458	55	33	4257	1	36	11	4916	1	51	4	0	47	0	47	0	0	20	60	80	0
North } *Signe* 5. South } *Signe* 11				*Signe* 4. *Signe* 10.				*Signe* 3. *Signe* 9.				S. 5. S. 11.		S. 4. S. 10.		S. 3. S. 9.		S.5 S11	S. 4. S.10.	S.3. S.9.	Argu

Argument of Latitude.

A Table of the Middle Motion of VENUS, for Yeares of the Chriſtian Æra, according to the Julian Account.

Yeares of Chriſt.	Longitude of ♀ S D ′ ″	Aphelion of ♀. S D ′ ″	Nod Aſcen. ☿. S D ′ ″
001	1 11 07 49	09 09 22 54	1 26 59 16
101	8 00 21 20	09 10 52 55	1 27 59 17
201	2 19 50 51	09 12 22 56	1 28 59 17
301	9 09 12 22	09 13 52 57	1 29 59 18
401	3 28 33 53	09 15 22 58	2 00 59 18
501	10 17 55 24	09 16 52 59	2 01 59 19
601	5 07 16 55	09 18 23 00	2 02 59 19
701	11 26 38 26	09 19 53 01	2 03 59 20
801	6 15 59 57	09 21 23 02	2 04 59 20
901	1 05 21 18	09 22 53 03	2 05 59 21
1001	7 24 42 59	09 24 23 04	2 06 59 21
1101	2 14 04 30	09 26 53 05	2 07 59 22
1201	9 03 26 01	09 28 23 06	2 08 59 22
1301	3 22 47 32	09 29 53 07	2 09 59 23
1401	10 12 09 03	10 01 23 08	2 10 59 23
1501	5 01 30 34	10 02 53 09	2 11 59 24
1601	11 20 52 05	10 04 23 10	2 12 59 24
1701	6 10 13 36	10 05 53 11	2 13 59 25
1801	0 29 35 07	10 07 23 12	2 14 59 25
1901	7 18 56 38	10 08 53 13	2 15 59 26
2001	2 08 18 09	10 10 23 14	2 16 59 26
2101	8 27 39 40	10 11 53 15	2 17 59 27
2201	3 17 01 11	10 13 23 16	2 18 59 27
2301	10 06 22 42	10 14 53 17	2 19 59 28
2401	4 25 44 13	10 16 23 18	2 20 59 28
2501	11 15 05 44	10 17 53 19	2 21 59 29
2601	6 04 27 15	10 19 23 20	2 22 59 29
2701	0 23 48 46	10 20 53 21	2 23 59 30
2801	7 13 10 17	10 22 23 22	2 24 59 30
2901	2 02 31 48	10 23 53 23	2 25 59 31
3001	8 21 53 19	10 25 23 24	2 26 59 31
4001	3 05 28 29	11 10 53 34	3 06 59 36
5001	9 19 03 39	11 25 23 44	3 16 59 41
6001	4 02 38 49	00 10 23 54	3 26 59 46
7001	10 16 13 59	00 25 24 04	4 06 59 51
8001	4 29 49 09	01 10 24 14	4 16 59 56

Months	Com. Year Lon. of ♀ S D ′ ″	Biſſ. Year Longi. ♀ S D ′ ″	Aph. ♀ ′ ″	Nod aſ. ♀ ′ ″
Januar.	0 0 0 0	0 0 0 0	0 0	0 0
Febru.	1 19 40 3	1 19 40 3	0 4	0 3
March	3 4 31 42	3 6 7 50	0 9	0 6
Aprill	4 24 11 44	4 25 47 52	0 14	0 9
May	6 12 15 39	6 13 51 47	0 18	0 12
June	8 1 55 42	8 3 31 50	0 22	0 15
July	9 19 57 37	9 21 33 45	0 27	0 18
Auguſt	11 9 39 39	11 11 15 47	0 31	0 21
Septēb	0 29 19 42	1 0 55 50	0 36	0 24
Octob.	2 17 23 37	2 18 59 45	0 41	0 27
Nove.	4 7 3 39	4 8 39 47	0 45	0 30
Decem	5 25 7 34	5 26 43 42	0 50	0 33

A Table of the Annuall Motion of ♀ for ſupplying of the intermediate Years of the former Table.

Years included.	Longitude of ♀ S D ′ ″	Aphelion of ♀ S D ′ ″	Node Aſc ♀. S D ′ ″
80	0 15 29 13	0 1 12 01	0 0 48 00
60	6 11 36 55	0 0 54 01	0 0 36 00
40	0 07 44 36	0 0 36 00	0 0 24 00
20	6 03 52 18	0 0 18 00	0 0 12 00
1	7 14 47 35	0 0 00 54	0 0 00 36
2	2 29 35 10	0 0 01 48	0 0 01 12
3	10 14 22 45	0 0 02 42	0 0 01 48
B 4	6 00 46 27	0 0 03 36	0 0 02 24
5	1 15 34 02	0 0 04 30	0 0 03 00
6	9 00 21 37	0 0 05 24	0 0 03 36
7	4 15 09 13	0 0 06 18	0 0 04 12
B 8	0 01 32 55	0 0 07 12	0 0 04 48
9	7 16 20 30	0 0 08 06	0 0 05 24
10	3 01 08 05	0 0 09 00	0 0 06 00
11	10 15 55 40	0 0 09 54	0 0 06 36
B 12	6 02 19 23	0 0 10 48	0 0 07 12
13	1 17 06 58	0 0 11 42	0 0 07 48
14	9 01 54 32	0 0 12 36	0 0 08 24
15	4 16 42 07	0 0 13 30	0 0 09 00
B 16	0 03 05 51	0 0 14 24	0 0 09 36
17	7 17 53 26	0 0 15 18	0 0 10 12
18	3 02 41 01	0 0 16 12	0 0 10 48
19	10 17 28 36	0 0 17 06	0 0 11 24
B 20	6 03 52 18	0 0 18 00	0 0 12 00

Dayes.	Longit. of ♀ S D ′ ″	H ′	Long. ♀ D ′ ″	H ′	Longit. of ♀ D ′ ″
1	0 1 36 8	1	0 4 0	31	2 4 10
2	0 3 12 16	2	0 8 1	32	2 8 11
3	0 4 44 23	3	0 12 1	33	2 12 11
4	0 6 24 31	4	0 16 1	34	2 16 11
5	0 8 0 39	5	0 20 2	35	2 20 12
6	0 9 36 47	6	0 24 2	36	2 24 12
7	0 11 12 55	7	0 28 2	37	2 28 12
8	0 12 49 3	8	0 32 2	38	2 32 12
9	0 14 25 10	9	0 36 3	39	2 36 13
10	0 16 01 18	10	0 40 3	40	2 40 13
11	0 17 37 26	11	0 44 3	41	2 44 13
12	0 19 13 34	12	0 48 4	42	2 48 14
13	0 20 49 42	13	0 52 4	43	2 52 14
14	0 22 25 50	14	0 56 4	44	2 56 14
15	0 24 01 57	15	1 0 5	45	3 0 15
16	0 25 38 5	16	1 4 5	46	3 4 15
17	0 27 14 13	17	1 8 5	47	3 8 15
18	0 28 50 21	18	1 12 5	48	3 12 16
19	1 0 26 29	19	1 16 6	49	3 16 16
20	1 2 02 37	20	1 20 6	50	3 20 16
21	1 3 38 44	21	1 24 6	51	3 24 17
22	1 5 14 52	22	1 28 7	52	3 28 17
23	1 6 51 0	23	1 32 7	53	3 32 18
24	1 8 27 8	24	1 36 7	54	3 36 18
25	1 10 03 16	25	1 40 8	55	3 40 18
26	1 11 39 23	26	1 44 8	56	3 44 19
27	1 13 15 31	27	1 48 8	57	3 48 19
28	1 14 51 39	28	1 52 9	58	3 52 20
29	1 16 27 47	29	1 56 9	59	3 56 20
30	1 18 03 55	30	2 0 10	60	4 0 20
31	1 19 40 3	″	′ ″ ‴	″	′ ″ ″

A Table of the abſolute Æquation of the firſt inequality of Venus.

Signe 0.

Degrees.	Anomalie co-æquated. S	D	′	″	Æquati. ♀ *Subſtract.* D	′	″	Diſtan. of ♀ frō ⊙
0	0	0	0	0	0	0	0	72807
1	0	0	59	34	0	0	48	72807
2	0	1	59	8	0	1	36	72807
3	0	2	58	43	0	2	24	72806
4	0	3	58	18	0	3	14	72806
5	0	4	57	52	0	4	4	72805
6	0	5	57	27	0	4	55	72804
7	0	6	57	2	0	5	44	72804
8	0	7	56	38	0	6	33	72803
9	0	8	56	13	0	7	22	72802
10	0	9	55	48	0	8	10	72801
11	0	10	55	24	0	8	59	72799
12	0	11	54	59	0	9	48	72797
13	0	12	54	34	0	10	37	72796
14	0	13	54	9	0	11	25	72794
15	0	14	53	44	0	12	14	72792
16	0	15	53	21	0	13	2	72789
17	0	16	52	57	0	13	50	72787
18	0	17	52	33	0	14	36	72784
19	0	18	52	10	0	15	24	72780
20	0	19	51	45	0	16	9	72777
21	0	20	51	21	0	16	55	72774
22	0	21	50	59	0	17	40	72770
23	0	22	50	36	0	18	24	72766
24	0	23	50	14	0	19	10	72763
25	0	24	49	52	0	19	55	72759
26	0	25	49	29	0	20	40	72756
27	0	26	49	7	0	21	24	72752
28	0	27	48	45	0	22	8	72749
29	0	28	48	24	0	22	53	72745
30	0	29	48	2	0	23	37	72740
Anomal.					*Adde.*			

Signe 11.

Signe 1.

Anomalie co-æquated. S	D	′	″	Æquati. ♀ *Subſtract.* D	′	″	Diſtan. of ♀ frō ⊙.	Degrees
0	29	48	2	0	23	37	72740	30
1	0	47	40	0	24	19	72735	29
1	1	47	19	0	25	1	72731	28
1	2	46	58	0	25	41	72726	27
1	3	46	36	0	26	22	72721	26
1	4	46	15	0	27	2	72717	25
1	5	45	53	0	27	42	72712	24
1	6	45	33	0	28	22	72707	23
1	7	45	12	0	29	0	72701	22
1	8	44	52	0	29	39	72696	21
1	9	44	32	0	30	17	72690	20
1	10	44	13	0	30	57	32684	19
1	11	43	54	0	31	34	72679	18
1	12	43	36	0	32	11	72674	17
1	13	43	17	0	32	46	72668	16
1	14	43	0	0	33	21	72661	15
1	15	42	43	0	33	56	72654	14
1	16	42	26	0	34	30	72648	13
1	17	42	10	0	35	4	72641	12
1	18	41	53	0	35	37	72635	11
1	19	41	37	0	36	10	72628	10
1	20	41	21	0	36	42	72622	9
1	21	41	6	0	37	12	72615	8
1	22	40	51	0	37	42	72610	7
1	23	40	36	0	38	11	72602	6
1	24	40	22	0	38	40	72594	5
1	25	40	7	0	39	8	72586	4
1	26	39	54	0	39	35	72579	3
1	27	39	41	0	40	1	72571	2
1	28	39	28	0	40	28	72565	1
1	29	39	16	0	40	54	72556	0
				Adde.				Anom.

Signe 10.

A Table of the abſolute Æquation of the firſt inequality of Venus.

Signe 2.

Degrees	Anomalie co-æquated.				Æquati. ♀ *Subſtract.*			Diſtanc of ♀ fró ⊙.
	S	D	′	″	D	′	″	
0	1	29	39	16	0	40	54	72556
1	2	0	39	4	0	41	18	72550
2	2	1	38	53	0	41	41	52542
3	2	2	38	43	0	42	5	72534
4	2	3	38	31	0	42	28	72527
5	2	4	38	21	0	42	50	72520
6	2	5	38	11	0	43	10	72512
7	2	6	38	2	0	43	29	72503
8	2	7	37	52	0	43	50	72494
9	2	8	37	43	0	44	8	72486
10	2	9	37	34	0	44	27	72477
11	2	10	37	26	0	44	45	72470
12	2	11	37	18	0	44	59	72461
13	2	12	37	11	0	45	16	72452
14	2	13	37	4	0	45	32	72444
15	2	14	36	58	0	45	46	72435
16	2	15	36	51	0	45	59	72427
17	2	16	36	45	0	46	11	72418
18	2	17	36	40	0	46	22	72410
19	2	18	36	35	0	46	33	72401
20	2	19	36	31	0	46	41	72393
21	2	20	36	28	0	46	50	72385
22	2	21	36	25	0	46	58	72376
23	2	22	36	22	0	47	7	72367
24	2	23	36	19	0	47	14	72358
25	2	24	36	17	0	47	20	72350
26	2	25	36	16	0	47	24	72342
27	2	26	36	14	0	47	27	72334
28	2	27	36	14	0	47	30	72326
29	2	28	36	13	0	47	32	72317
30	2	29	36	13	0	47	33	72308
Anomal.	*Adde.*							
	Signe 9.							

Signe 3.

Anomalie co-æquated.				Æquati. ♀ *Subſtract.*			Diſtanc of ♀ fró ⊙.	Degrees.
S	D	′	″	D	′	″		
2	29	36	13	0	47	33	72308	30
3	0	36	14	0	47	33	72298	29
3	1	36	15	0	47	33	72290	28
3	2	36	16	0	47	32	72281	27
3	3	36	18	0	47	30	52272	26
3	4	36	21	0	47	26	72263	25
3	5	36	24	0	47	19	72254	24
3	6	36	27	0	47	14	72245	23
3	7	36	30	0	47	8	72237	22
3	8	36	34	0	47	2	72228	21
3	9	36	38	0	46	54	32219	20
3	10	36	42	0	46	45	72211	19
3	11	36	47	0	46	37	72203	18
3	12	36	53	0	46	27	72195	17
3	13	37	0	0	46	16	72187	16
3	14	37	7	0	46	4	72179	15
3	15	37	14	0	45	51	72170	14
3	16	37	21	0	45	38	72161	13
3	17	37	28	0	45	24	72152	12
3	18	37	37	0	45	8	72144	11
3	19	37	46	0	44	52	72136	10
3	20	37	55	0	44	36	72127	9
3	21	38	5	0	44	18	72119	8
3	22	38	15	0	43	59	72110	7
3	23	38	25	0	43	39	72102	6
3	24	38	35	0	43	19	72094	5
3	25	38	46	0	42	57	72086	4
3	26	38	57	0	42	36	72079	3
3	27	39	8	0	42	13	72071	2
3	28	39	20	0	41	50	72064	1
3	29	39	32	0	41	26	72057	0
Adde.								Anoma.
Signe 8.								

A Table of the abſolute Æquation of the firſt inequality of Venus.

Signe 4.

Degrees.	Anomalie co-æquated. S	D	′	″	Æquati. ♀ Subſtract. D	′	″	Diſtan. of ♀ frõ ⊙
0	3	29	39	32	0	41	26	72057
1	4	0	39	45	0	41	2	72050
2	4	1	39	59	0	40	36	72042
3	4	2	40	13	0	40	9	72034
4	4	3	40	27	0	39	41	72026
5	4	4	40	41	0	39	12	72019
6	4	5	40	56	0	38	42	72011
7	4	6	41	10	0	38	14	72004
8	4	7	41	26	0	37	43	71998
9	4	8	41	41	0	37	13	71991
10	4	9	41	58	0	36	43	71985
11	4	10	42	14	0	36	11	71978
12	4	11	42	30	0	35	37	71972
13	4	12	42	47	0	35	2	71966
14	4	13	43	4	0	34	28	71959
15	4	14	43	21	0	33	54	71953
16	4	15	43	38	0	33	18	71946
17	4	16	43	56	0	32	46	71940
18	4	17	44	14	0	32	5	71934
19	4	18	44	33	0	31	28	71929
20	4	19	44	52	0	30	49	71924
21	4	20	45	11	0	30	10	71918
22	4	21	45	31	0	29	30	71912
23	4	22	45	51	0	28	50	71907
24	4	23	46	11	0	28	10	71902
25	4	24	46	32	0	27	29	71896
26	4	25	46	53	0	26	48	71892
27	4	26	47	14	0	26	7	71887
28	4	27	47	35	0	25	24	71882
29	4	28	47	56	0	24	42	71877
30	4	29	48	17	0	23	59	71873
Anomal.	Adde.							
	Signe 7.							

Signe 5.

Anomalie co-æquated. S	D	′	″	Æquati. ♀ Subſtract. D	′	″	Diſtan. of ♀ frõ ⊙.	Degrees
4	29	48	17	0	23	59	71873	30
5	0	48	39	0	23	15	71868	29
5	1	48	59	0	22	31	71864	28
5	2	49	20	0	21	46	71860	27
5	3	49	42	0	21	1	71857	26
5	4	50	5	0	20	16	71853	25
5	5	50	27	0	19	30	71850	24
5	6	50	49	0	18	43	71847	23
5	7	51	11	0	17	58	71844	22
5	8	51	33	0	17	12	71840	21
5	9	51	57	0	16	25	71836	20
5	10	52	21	0	15	37	71833	19
5	11	52	44	0	14	49	71830	18
5	12	53	8	0	14	0	71827	17
5	13	53	32	0	13	12	71824	16
5	14	53	55	0	12	23	71821	15
5	15	54	19	0	11	34	71819	14
5	16	54	43	0	10	46	71818	13
5	17	55	7	0	9	58	71816	12
5	18	55	31	0	9	9	71814	11
5	19	55	55	0	8	20	71813	10
5	20	56	20	0	7	31	71812	9
5	21	56	44	0	6	42	71811	8
5	22	57	8	0	5	52	71810	7
5	23	57	32	0	5	1	71810	6
5	24	57	56	0	4	10	71809	5
5	25	58	21	0	3	20	71808	4
5	26	58	46	0	2	30	71808	3
5	27	59	10	0	1	39	71807	2
5	28	59	35	0	0	49	71807	1
6	0	0	0	0	0	0	71807	0
Adde.								Anomal.
Signe 6.								

A Table of the Inclination, Reduction, and Curtation of VENUS.

Argument of Latitude.

	North Signe 0. South Signe 6,				*Signe* 1. *Signe* 7.				*Signe* 2 *Signe* 8.				S. 0. S. 6.		*S.* 3. S. 7.		S. 2. S. 8.		S0 S6	S. 1 S. 7	S. 2 S. 8	
Degrees	Inclination				Inclination				Inclination				Reduction.						Curtation			*Degrees*
	Parts.	D	′	″	Parts.	D	′	″	Parts.	D	′	″	′	″	′	″	′	″	Pa	Pa	Part	
0	0	0	0	0	2132	1	41	22	3693	2	55	38	0	0	2	35	2	35	0	31	95	30
1	75	0	3	32	2196	1	44	26	3729	2	57	23	0	7	2	38	2	32	0	33	97	29
2	149	0	7	4	2260	1	47	27	3765	2	59	5	0	13	2	42	2	28	0	35	99	28
3	223	0	10	36	2322	1	50	25	3799	3	0	43	0	19	2	45	2	25	1	37	101	27
4	297	0	14	9	2384	1	53	22	3832	3	2	17	0	26	2	47	2	21	1	39	103	26
5	372	0	17	40	2446	1	56	18	3864	3	3	48	0	32	2	50	2	16	2	41	105	25
6	446	0	21	11	2506	1	59	13	3895	3	5	15	0	38	2	52	2	12	2	43	107	24
7	520	0	24	41	2566	2	2	3	3925	3	6	38	0	45	2	54	2	8	3	45	108	23
8	593	0	28	11	2625	2	4	52	3954	3	8	1	0	51	2	55	2	3	4	48	109	22
9	698	0	31	41	2683	2	7	37	3981	3	9	19	0	57	2	56	1	59	4	50	111	21
10	740	0	35	11	2741	2	10	21	4007	3	10	34	1	2	2	56	1	24	5	52	112	20
11	814	0	38	40	2797	2	13	2	4032	3	11	44	1	8	2	57	1	50	6	54	113	19
12	886	0	42	9	2853	2	15	42	4055	3	12	52	1	13	2	58	1	45	6	56	114	18
13	959	0	45	37	2908	2	18	18	4078	3	13	56	1	18	2	59	1	40	7	58	115	17
14	1032	0	49	4	2962	2	20	52	4099	3	14	57	1	24	2	59	1	34	8	60	116	16
15	1104	0	52	28	3015	2	23	23	4019	3	15	54	1	29	3	0	1	29	9	63	117	15
16	1176	0	55	52	3067	2	25	51	4137	3	16	47	1	34	2	59	1	24	10	66	118	14
17	1247	0	59	15	3118	2	28	18	4155	3	17	37	1	40	2	59	1	18	11	68	119	13
18	1318	1	2	37	3169	2	30	41	4171	3	18	24	1	45	2	58	1	13	12	70	120	12
19	1388	1	5	59	3218	2	33	2	4186	3	19	6	1	50	2	57	1	8	13	72	121	11
20	1458	1	9	20	3266	2	35	20	4199	3	19	45	1	54	2	56	1	2	14	74	122	10
21	1528	1	12	40	3314	2	37	36	4212	3	20	20	1	59	2	56	0	57	16	76	123	9
22	1597	1	15	59	3360	2	39	49	4223	3	20	52	2	3	2	55	0	51	17	78	124	8
23	1666	1	19	14	3405	2	41	58	4232	3	21	20	2	8	2	54	0	45	18	81	124	7
24	1734	1	22	28	345[illegible]	2	44	3	4241	3	21	44	2	12	2	52	0	38	20	83	125	6
25	1802	1	25	41	3493	2	46	7	4248	3	22	4	2	16	2	50	0	32	21	85	125	5
26	1869	1	28	51	3535	2	48	7	4254	3	22	21	2	21	2	47	0	26	23	87	125	4
27	1936	1	32	0	3576	2	50	4	4258	3	22	33	2	25	2	45	0	19	25	89	126	3
28	2002	1	35	9	3616	2	51	59	4261	3	22	42	2	28	2	42	0	13	27	91	126	2
29	2067	1	38	17	3655	2	53	49	4263	3	22	48	2	32	2	38	0	7	29	93	126	1
30	2132	1	41	22	3693	2	55	38	4264	3	22	50	2	35	2	35	0	0	31	95	126	0
	North *Signe* 5. South *Signe* 11.				*Signe* 4. *Signe* 10.				*Signe* 3. *Signe* 9.				S. 5. S.11.		S. 4. S. 10.		S. 3. S. 9		S 5 S11	S 4 S10	S 3 S 9	Argu

Argument of Latitude.

A Table of the Middle Motion of MERCURY, for Yeares of the Chriſtian Æra, according to the Julian Account.

Yeares of Chriſt.	Longitude of ☿ S D ′ ″	Aphelion of ☿. S D ′ ″	Nod. Aſcen. ☿. S D ′ ″
001	10 12 09 43	6 26 23 41	0 02 29 57
101	0 26 34 43	6 29 17 43	0 04 59 57
201	3 10 59 43	7 02 11 45	0 07 29 58
301	5 25 24 44	7 05 05 47	0 09 59 58
401	8 09 49 44	7 07 59 49	0 12 29 58
501	10 24 14 44	7 10 53 51	0 14 59 58
601	1 08 39 45	7 13 47 53	0 17 29 58
701	3 23 04 45	7 16 41 56	0 19 59 58
801	6 07 29 45	7 19 35 58	0 22 29 59
901	8 21 54 46	7 22 30 00	0 24 59 59
1001	11 06 19 46	7 25 24 02	0 27 29 59
1101	1 20 44 46	7 28 18 04	0 29 59 59
1201	4 05 09 47	8 01 12 06	1 02 29 59
1301	6 19 34 47	8 04 06 08	1 04 59 59
1401	9 03 59 47	8 07 00 11	1 07 30 00
1501	11 18 24 48	8 09 54 13	1 10 00 00
1601	2 02 49 48	8 12 48 15	1 12 30 00
1701	4 17 14 48	8 15 42 17	1 15 00 00
1801	7 01 39 49	8 18 36 19	1 17 30 00
1901	9 16 04 49	8 21 30 21	1 20 00 00
2001	0 00 29 49	8 24 24 23	1 22 30 01
2101	2 14 54 50	8 27 18 25	1 25 00 01
2201	4 29 19 50	9 00 12 28	1 27 30 01
2301	7 13 44 50	9 03 06 30	2 00 00 01
2401	9 28 09 51	9 06 00 32	2 02 30 01
2501	0 12 34 51	9 08 54 34	2 05 00 01
2601	2 26 59 51	9 11 48 36	2 07 30 02
2701	5 11 24 52	9 14 42 38	2 10 00 0’
2801	7 25 49 52	9 17 36 40	2 12 30 02
2901	10 10 14 52	9 20 30 42	2 15 00 02
3001	0 24 39 53	9 23 24 45	2 17 30 02
4001	1 18 49 57	10 22 25 06	3 12 30 04
5001	2 13 00 01	11 21 25 28	4 07 30 06
6001	3 07 10 05	0 20 20 50	5 2 30 08
7001	4 01 20 08	1 19 26 12	5 27 30 10
8001	4 25 30 12	2 18 26 34	6 22 30 12

Months	Com. Year Lon. of ☿ S D ′ ″	Biſſ. Year Longi. ☿ S D ′ ″	Aph. ☿ ′ ″	Nod. aſ. ☿ ′ ″
Januar.	0 0 0 0	0 00 00 00	0 0	0 0
Febru.	4 6 51 50	4 06 51 50	0 9	0 8
March	8 1 27 3	8 05 32 35	0 17	0 15
Aprill	0 8 18 53	0 12 24 25	0 26	0 23
May	4 11 5 11	4 15 10 43	0 35	0 29
June	8 17 57 1	8 22 02 33	0 44	0 37
July	0 20 43 19	0 24 48 51	0 52	0 44
Auguſt	4 27 35 9	5 01 40 41	1 1	0 52
Septēb	9 4 26 59	9 08 32 31	1 9	1 0
Octob.	1 7 13 17	1 11 18 49	1 18	1 8
Nove.	5 14 5 8	5 18 10 40	1 27	1 15
Decem	9 16 51 26	9 20 56 58	1 35	1 22

A Table of the Annuall Motion of ☿ for ſupplying of the intermediate Years of the former Table.

Years included.	Longitude of ☿ S D ′ ″	Aphelion of ☿ S D ′ ″	Node Aſc ☿. S D ′ ″
80	1 29 32 00	0 2 19 14	0 2 00 00
60	1 14 39 00	0 1 44 25	0 1 30 00
40	0 29 46 00	0 1 09 37	0 1 00 00
20	0 14 53 00	0 0 34 48	0 0 30 00
1	1 23 43 16	0 0 01 44	0 0 01 30
2	3 17 26 32	0 0 03 28	0 0 03 00
3	5 11 09 48	0 0 05 13	0 0 04 30
B 4	7 08 58 36	0 0 06 57	0 0 06 0
5	9 02 41 52	0 0 08 41	0 0 07 30
6	10 26 25 08	0 0 10 26	0 0 09 0
7	0 20 08 24	0 0 12 10	0 0 10 30
B 8	2 17 57 13	0 0 13 59	0 0 12 0
9	4 11 40 28	0 0 15 35	0 0 13 30
10	6 05 23 44	0 0 17 24	0 0 15 0
11	7 29 07 00	0 0 19 08	0 0 16 30
B 12	9 26 55 49	0 0 20 53	0 0 18 0
13	11 20 39 05	0 0 22 37	0 0 19 30
14	1 14 22 21	0 0 34 22	0 0 21 0
15	3 08 05 37	0 0 26 06	0 0 22 30
B 16	5 05 54 25	0 0 27 51	0 0 24 0
17	6 29 37 41	0 0 29 35	0 0 25 30
18	8 23 20 57	0 0 31 19	0 0 27 0
19	10 17 4 13	0 0 33 43	0 0 28 30
B 20	0 14 53 00	0 0 34 38	0 0 30 0

Dayes.	Longit. of ☿ S D ′ ″	H ′	Long. ☿ D ′ ″	H ′	Longit. of ☿ D ′ ″
1	0 4 5 32	1	0 10 14	31	5 17 9
2	0 8 11 5	2	0 20 28	32	5 27 22
3	0 12 16 38	3	0 30 42	33	5 37 36
4	0 16 22 10	4	0 40 56	34	5 47 50
5	0 20 27 43	5	0 51 9	35	5 58 4
6	0 24 33 16	6	1 1 23	36	6 8 18
7	0 28 38 48	7	1 11 37	37	6 18 32
8	1 2 44 21	8	1 21 51	38	6 28 46
9	1 6 49 53	9	1 31 5	39	6 39 0
10	1 10 55 26	10	1 42 19	40	6 49 14
11	1 15 0 58	11	1 52 32	41	6 59 28
12	1 19 6 31	12	2 2 46	42	7 9 42
13	1 23 12 4	13	2 13 0	43	7 19 56
14	1 27 17 36	14	2 23 14	44	7 30 8
15	2 1 23 9	15	2 33 28	45	7 40 22
16	2 5 28 41	16	2 43 41	46	7 50 36
17	2 9 34 14	17	2 53 55	47	8 0 50
18	2 13 39 47	18	3 4 9	48	8 11 4
19	2 17 45 19	19	3 14 23	49	8 21 18
20	2 21 50 52	20	3 24 37	50	8 31 32
21	2 25 56 24	21	3 34 51	51	8 41 46
22	3 0 1 57	22	3 45 4	52	8 52 0
23	3 4 7 30	23	3 55 18	53	9 2 14
24	3 8 13 2	24	4 5 32	54	9 12 28
25	3 12 18 35	25	4 15 46	55	9 22 42
26	3 16 24 7	26	4 26 0	56	9 32 56
27	3 20 29 40	27	4 36 14	57	9 43 10
28	3 24 35 13	28	4 46 28	58	9 53 24
29	3 28 40 45	29	4 56 42	59	10 3 38
30	4 2 46 18	30	5 6 56	60	11 13 52
31	4 6 51 50	″	′ ″ ‴	″	′ ″ ‴

A Table of the abſolute Æquation of the firſt inequality of Mercury.

Signe 0.

Degrees.	Anomalie co-æquated.				Æquati. ☿ *Subſtract.*			Diſtan. of ☿ frō ☉.
	S	D	′	″	D	′	″	
0	0	0	0	0	0	0	0	46770
1	0	0	46	17	0	20	22	4676[illegible]
2	0	1	32	35	0	40	42	46766
3	0	2	18	56	1	0	59	46763
4	0	3	5	7	1	21	9	46758
5	0	3	51	25	1	41	18	46751
6	0	4	37	45	2	1	22	46742
7	0	5	24	7	2	21	23	46732
8	0	6	10	31	2	41	24	46722
9	0	6	56	58	3	1	20	46707
10	0	7	44	27	3	21	15	46691
11	0	8	29	59	3	41	7	46674
12	0	9	16	34	4	0	49	46656
13	0	10	3	10	4	20	27	46637
14	0	10	49	49	4	40	1	46617
15	0	11	36	32	4	59	30	46596
16	0	12	23	7	5	18	55	46574
17	0	13	10	4	5	38	16	46549
18	0	13	57	0	5	57	37	46523
19	0	14	43	59	6	16	50	46494
20	0	15	31	3	6	35	59	46465
21	0	16	8	14	6	55	3	46432
22	0	17	5	30	7	14	0	46400
23	0	17	52	52	7	32	52	46366
24	0	18	40	20	7	51	42	46331
25	0	19	27	57	8	10	26	46293
26	0	20	15	38	8	29	6	46253
27	0	21	3	24	8	47	39	46214
28	0	21	51	16	9	6	6	46170
29	0	22	39	16	9	24	27	46126
30	0	23	27	24	9	42	45	46081
Anomal	*Adde.*							
	Signe 11.							

Signe 1.

Anomalie co-æquated.				Æquati. ☿ *Subſtract.*			Diſtan. of ☿ frō ☉.	Degrees.
S	D	′	″	D	′	″		
0	23	27	24	9	42	45	46081	30
0	24	15	39	10	0	57	46035	29
0	25	4	3	10	19	1	45987	28
0	25	52	36	10	36	57	45935	27
0	26	41	17	10	54	48	45882	26
0	27	30	7	11	12	36	45829	25
0	28	19	4	11	30	18	45775	24
0	29	8	11	11	47	53	45717	23
0	29	57	28	12	5	22	45669	22
1	0	46	55	12	22	42	45601	21
1	1	36	31	12	39	58	45539	20
1	2	26	14	12	56	7	45477	19
1	3	16	8	13	14	9	45411	18
1	4	6	14	13	31	3	45343	17
1	4	56	31	13	47	52	45275	16
1	5	46	58	14	4	32	45205	15
1	6	37	36	14	21	4	45133	14
1	7	28	26	14	37	29	45059	13
1	8	19	28	14	53	48	44987	12
1	9	10	42	15	9	59	44913	11
1	10	2	7	15	26	1	44833	10
1	10	53	43	15	41	56	44752	9
1	11	45	31	15	57	41	44673	8
1	12	37	32	16	13	16	44552	7
1	13	29	48	16	28	49	44506	6
1	14	22	17	16	44	11	44420	5
1	15	14	58	16	59	23	44333	4
1	16	7	50	17	14	24	44243	3
1	16	0	59	17	29	13	44152	2
1	17	54	18	17	43	54	44059	1
1	18	47	47	17	58	24	43964	0
Adde.								*Anomal*
Signe 10.								

A Table of the abſolute Æquation of the firſt inequality of Mercury.

Signe 2.

Degrees.	Anomalie co-æquated. S	D.	′	″	Æquati. ♀ Subſtract. D	′	″	Diſtan. of ☿ frō ☉
0	1	18	47	47	17	58	24	43964
1	1	19	41	34	18	12	43	43867
2	1	20	35	35	18	26	53	43769
3	1	21	29	52	18	40	56	43670
4	1	22	24	20	18	54	44	43568
5	1	23	19	4	19	8	18	43466
6	1	24	14	2	19	21	42	43364
7	1	25	9	15	19	34	54	43258
8	1	26	4	43	19	47	55	43150
9	1	27	0	26	20	0	42	43043
10	1	27	56	23	20	13	17	42933
11	1	28	52	33	20	25	47	42822
12	1	29	48	58	20	37	44	42707
13	2	0	45	38	20	49	34	42592
14	2	1	42	34	21	1	12	42474
15	2	2	39	45	21	12	37	42356
16	2	3	37	14	21	23	44	42236
17	2	4	34	56	21	34	32	42118
18	2	5	32	56	21	45	6	41993
19	2	6	31	4	21	55	23	41870
20	2	7	29	33	22	5	22	41746
21	2	8	28	19	22	15	4	41620
22	2	9	27	21	22	24	28	41493
23	2	10	26	35	22	33	31	41464
24	2	11	26	4	22	42	18	41234
25	2	12	25	49	22	50	44	41103
26	2	13	25	49	22	58	39	40971
27	2	14	26	4	23	6	28	40838
28	2	15	26	34	23	13	53	40701
29	2	16	27	21	23	20	54	40563
30	2	17	28	24	23	27	36	40426
Anomal.					*Adde.*			

Signe 9.

Signe 3.

Anomalie co-æquated. S	D	′	″	Æquati. ♀ Subſtract D	′	″	Diſtan. of ☿ frō ☉.	Degrees
2	17	28	24	23	27	36	40426	30
2	18	29	41	23	33	52	40288	29
2	19	31	14	23	39	46	40147	28
2	20	33	1	23	45	14	39006	27
2	21	35	2	23	50	21	39865	26
2	22	37	17	23	55	1	39722	25
2	23	39	47	23	59	8	39580	24
2	24	42	33	24	2	41	39436	23
2	25	45	31	24	6	7	39290	22
2	26	48	46	24	9	6	39140	21
2	27	52	13	24	11	34	38998	20
2	28	55	54	24	13	33	38851	19
2	29	59	50	24	15	6	38701	18
3	1	4	21	24	16	8	38553	17
3	2	8	23	24	16	40	38409	16
3	3	12	57	24	16	42	38259	15
3	4	17	46	24	16	15	38106	14
3	5	22	48	24	15	18	37953	13
3	6	28	3	24	13	48	37807	12
3	7	34	24	24	11	45	37657	11
3	8	40	4	24	9	9	37507	10
3	9	45	56	24	6	2	37357	9
3	10	51	31	24	2	23	37206	8
3	11	57	17	23	58	13	37054	7
3	13	3	45	23	53	33	36902	6
3	14	10	23	23	48	25	36753	5
3	15	17	11	23	42	27	36604	4
3	16	24	9	23	35	58	36455	3
3	17	31	17	23	28	59	36303	2
3	18	38	37	23	21	15	36153	1
3	19	46	8	23	13	8	36002	0
				Adde.				Anomal.

Signe 8.

A Table of the abſolute Æquation of the firſt inequality of Mercury.

Signe 4.

Degrees	Anomalie co-æquated.				Æquati. ☿ *Subſtract.*			Diſtan. of ☿ frõ ☉.
	S	D	′	″	D	′	″	
0	3	19	46	8	23	13	8	36002
1	3	20	53	48	23	4	26	35855
2	3	22	1	37	22	55	20	35708
3	3	23	9	36	22	45	26	35555
4	3	24	17	43	22	34	47	35405
5	3	25	25	59	22	23	39	35256
6	3	26	34	21	22	11	57	35120
7	3	27	42	50	21	59	45	34975
8	3	28	51	29	21	46	56	34833
9	4	0	0	18	21	33	36	34691
10	4	1	9	17	21	19	26	34550
11	4	2	18	22	21	4	40	34413
12	4	3	27	33	20	49	28	34274
13	4	4	36	49	20	33	39	34138
14	4	5	46	10	20	17	23	33999
15	4	6	55	38	20	0	28	33869
16	4	8	5	14	19	43	2	33739
17	4	9	14	56	19	24	56	33610
18	4	10	24	43	19	6	12	33477
19	4	11	34	33	18	47	2	33353
20	4	12	44	30	18	27	18	33226
21	4	13	54	32	18	7	5	33107
22	4	15	4	40	17	46	15	32985
23	4	16	14	53	17	24	56	32865
24	4	17	25	10	17	3	8	32746
25	4	18	35	26	16	40	45	32636
26	4	19	45	44	16	17	54	32524
27	4	20	56	9	15	54	40	32412
28	4	22	6	40	15	30	45	32306
29	4	23	17	16	15	6	29	32200
30	4	24	28	00	14	41	54	32097
Anomal					*Adde.*			

Signe 7.

Signe 5.

Anomalie co-æquated.				Æquati. ☿ *Subſtract.*			Diſtan. of ☿ frõ ☉.	Degrees.
S	D	′	″	D	′	″		
4	24	28	0	14	41	54	32097	30
4	25	38	38	14	17	20	31997	29
4	26	49	19	13	51	8	31903	28
4	28	0	8	13	25	7	31811	27
4	29	10	56	12	58	32	31718	26
5	0	21	47	12	31	40	31628	25
5	1	32	40	12	4	42	31545	24
5	2	43	36	11	37	5	31453	23
5	3	54	33	11	9	10	31382	22
5	5	5	32	10	40	58	31305	21
5	6	16	31	10	12	27	31235	20
5	7	27	32	9	43	36	31166	19
5	8	38	34	9	14	27	31100	18
5	9	49	37	8	44	58	31038	17
5	11	0	41	8	15	23	30978	16
5	12	11	48	7	45	30	30921	15
5	13	22	57	7	15	34	30896	14
5	14	34	7	6	45	3	30818	13
5	15	45	17	6	14	26	30776	12
5	16	56	28	5	43	46	30731	11
5	18	7	39	5	13	1	30693	10
5	19	18	51	4	42	1	30659	9
5	20	30	4	4	10	54	30629	8
5	21	41	18	3	39	36	30601	7
5	22	52	33	3	8	20	30578	6
5	24	3	49	2	37	5	30557	5
5	25	15	4	2	5	46	30539	4
5	26	26	19	1	34	22	30527	3
5	27	37	33	1	2	55	30519	2
5	28	48	47	0	31	29	30514	1
6	00	00	00	0	00	00	30510	0
				Adde.				Anomal

Signe 6.

A Table of the Inclination, Reduction, and Curtation of MERCURY.

Argument of Latitude.

	North Signe 0. South Signe 6.				Signe 1. Signe 7.				Signe 2. Signe 8.				S. 0. S. 6.		S. 1. S. 7.		S. 2. S. 8.		S.0 S.6	S. 1. S. 7.	2. S8.	
Degrees	Inclination.				Inclination.				Inclination.				Reduction.						Curtation.			*Degrees*
	Parts	D	′	″	Parts	D	′	″	Parts	D	′	″	′	″	′	″	′	″	Pa	Part	Part	
0	0	0	0	0	2297	3	27	0	3979	5	58	32	0	00	10	49	10	49	0	69	207	30
1	80	0	7	13	2366	3	33	13	4018	6	2	6	0	20	11	2	10	36	0	73	211	29
2	160	0	14	27	2434	3	39	22	4056	6	5	33	0	52	11	14	10	22	0	77	215	28
3	240	0	21	40	2502	3	45	28	4093	6	8	53	1	18	11	25	10	7	1	82	219	27
4	320	0	28	53	2569	3	51	30	4129	6	12	6	1	44	11	35	9	51	1	86	223	26
5	400	0	36	5	2635	3	57	28	4163	6	15	13	2	10	11	44	9	34	2	91	227	25
6	480	0	43	16	2700	4	3	21	4197	6	18	13	2	35	11	53	9	17	3	96	230	24
7	560	0	50	26	2765	4	9	9	4229	6	21	6	3	1	10	1	8	59	4	101	234	23
8	639	0	57	36	2828	4	14	53	4260	6	23	51	3	26	12	8	8	41	5	106	237	22
9	719	1	4	45	2891	4	20	32	4289	6	26	29	3	51	12	14	8	22	7	110	240	21
10	799	1	11	53	2953	4	26	6	4317	6	29	0	4	16	12	19	8	2	8	115	243	20
11	877	1	18	59	3014	4	31	35	4344	6	31	24	4	40	12	23	7	42	10	119	247	19
12	955	1	26	4	3074	4	37	0	4369	6	33	42	5	4	12	26	7	21	12	124	250	18
13	1033	1	33	7	3133	4	42	20	4393	6	35	53	5	28	12	28	6	59	14	128	253	17
14	1111	1	40	8	3191	4	47	35	4416	6	37	57	5	51	12	29	6	37	16	133	256	16
15	1189	1	47	8	3249	4	52	45	4437	6	39	53	6	14	12	30	6	14	18	138	258	15
16	1266	1	54	6	3305	4	57	49	4457	6	41	42	6	37	12	29	5	51	21	143	260	14
17	1343	2	1	2	3360	5	2	48	4476	6	43	23	6	59	12	28	5	28	23	148	262	13
18	1420	2	7	56	3414	5	7	41	4494	6	44	57	7	21	12	26	5	4	26	152	264	12
19	1496	2	14	47	3467	5	12	28	4510	6	46	24	7	42	12	23	4	40	29	157	266	11
20	1571	2	21	35	3519	5	17	9	4524	6	47	43	8	2	12	19	4	16	32	161	268	10
21	1646	2	28	21	3570	5	21	44	4537	6	48	54	8	22	12	14	3	51	36	166	269	9
22	1721	2	35	5	3620	5	26	13	4549	6	49	58	8	41	12	8	3	26	39	170	271	8
23	1795	2	41	46	3669	5	30	37	4560	6	50	55	8	59	12	1	3	1	43	175	272	7
24	1869	2	48	24	3717	5	34	55	4569	6	51	44	9	17	11	53	2	35	46	180	273	6
25	1942	2	54	58	3763	5	39	7	4576	6	52	25	9	34	11	44	2	10	50	185	274	5
26	2014	3	1	29	3809	5	43	13	4583	6	52	59	9	51	11	35	1	44	53	189	275	4
27	2086	3	7	57	3053	5	47	13	4588	6	53	26	10	7	11	25	1	18	57	194	276	3
28	2157	3	14	22	3896	5	51	0	4591	6	53	45	10	22	11	14	0	52	61	199	277	2
29	2227	3	20	43	3938	5	54	52	4593	6	53	56	10	36	11	2	0	20	65	203	277	1
30	2297	3	27	0	3979	5	58	32	4594	6	54	0	10	49	10	49	0	00	69	207	277	0
	North Signe 5. South Signe 11				Signe 4. Signe 10.				Signe 3. Signe 9.				S. 5. S. 11.		S. 4. S. 10.		S. 3. S. 9.		S.5 S11	S.4. S.10.	S.3. S.9.	Argu

Argument of Latitude.

A Table of Declinations.

North Latitude.

	0		1		2		3		4		5	
	D	′	D	′	D	′	D	′	D	′	D	′
♋	23	31	24	31	25	31	26	31	27	31	28	31
1	23	31	24	31	25	31	26	31	27	31	28	31
2	23	31	24	31	25	31	26	31	27	31	28	31
3	23	30	24	30	25	30	26	30	27	30	28	30
4	23	28	24	29	25	28	26	28	27	28	28	28
5	23	26	24	26	25	26	26	26	27	25	28	25
6	23	23	24	23	25	23	26	23	27	22	28	22
7	23	20	24	20	25	20	26	20	27	19	28	19
8	23	17	24	17	25	17	26	16	27	16	28	16
9	23	13	24	13	25	13	26	13	27	12	28	12
10	23	09	24	09	25	09	26	09	27	08	28	08
11	23	04	24	04	25	04	26	04	27	03	28	03
12	22	59	23	59	24	59	25	59	26	58	27	58
13	22	53	23	53	24	53	25	53	26	52	27	52
14	22	47	23	47	24	46	25	46	26	46	27	45
15	22	41	23	41	24	40	25	40	26	40	27	39
16	22	34	23	34	24	33	25	33	26	33	27	32
17	22	27	23	27	24	26	25	26	26	25	27	25
18	22	19	23	19	24	18	25	18	26	17	27	16
19	22	10	23	10	24	09	25	09	26	08	27	07
20	22	02	23	02	24	01	25	00	25	59	26	58
21	21	53	22	53	23	52	24	51	25	50	26	49
22	21	43	22	43	23	42	24	41	25	40	26	39
23	21	33	22	33	23	32	24	31	25	30	26	29
24	21	23	22	22	23	21	24	20	25	19	26	18
25	21	13	22	11	23	10	24	09	25	08	26	07
26	21	01	22	00	22	59	23	58	24	57	25	56
27	20	50	21	48	22	47	23	46	24	45	25	44
28	20	38	21	36	22	35	23	34	24	33	25	32
29	20	26	21	23	22	22	23	21	24	20	25	19
30	20	13	21	12	22	10	23	09	24	07	25	06

♌	20	13	21	12	22	10	23	09	24	07	25	06
1	20	00	20	59	21	57	22	55	23	54	24	53
2	19	47	20	45	21	44	22	42	23	40	24	39
3	19	33	20	31	21	30	22	28	23	26	24	25
4	19	19	20	17	21	16	22	14	23	12	24	11
5	19	05	20	03	21	02	22	00	22	58	23	56
6	18	50	19	49	20	47	21	45	22	43	23	41
7	18	35	19	34	20	32	21	29	22	27	23	25
8	18	20	19	18	20	16	21	13	22	11	23	09
9	18	04	19	02	20	00	20	57	21	55	22	53
10	17	48	18	46	19	44	20	41	21	39	22	37
11	17	32	18	29	19	27	20	25	21	22	22	20
12	17	15	18	12	19	10	20	08	21	05	22	03
13	16	58	17	55	18	53	19	51	20	48	21	46
14	16	41	17	38	18	36	19	33	20	30	21	28
15	16	24	17	21	18	18	19	15	20	12	21	10
16	16	06	17	03	18	00	18	57	19	54	20	52
17	15	48	16	45	17	42	18	39	19	36	20	33
18	15	29	16	26	17	23	18	20	19	17	20	14
19	15	11	16	08	17	04	18	01	18	58	19	55
20	14	52	15	49	16	45	17	42	18	39	19	36
21	14	33	15	30	16	26	17	23	18	20	19	17
22	14	14	15	11	16	07	17	04	18	00	18	57
23	13	54	14	51	15	47	16	44	17	40	18	37
24	13	34	14	31	15	27	16	24	17	20	18	17
25	13	14	14	11	15	07	16	04	17	00	17	57
26	12	54	13	51	14	47	15	43	16	38	17	36
27	12	33	13	30	14	26	15	22	16	19	17	15
28	12	13	13	09	14	05	15	01	15	57	16	54
29	11	52	12	48	13	44	14	40	15	36	16	33
30	11	31	12	27	13	23	14	19	15	15	16	11

South Latitude.

0		1		2		3		4		5		
D	′	D	′	D	′	D	′	D	′	D	′	
23	31	22	31	21	31	20	31	19	31	18	31	30
23	31	22	31	21	31	20	31	19	31	18	31	29
23	31	22	31	21	31	20	31	19	31	18	31	28
23	30	22	30	21	30	20	30	19	30	18	30	27
23	28	22	28	21	28	20	28	19	28	18	28	26
23	26	22	26	21	26	20	26	19	26	18	26	25
23	23	22	23	21	23	20	23	19	23	18	23	24
23	20	22	20	21	20	20	20	19	20	18	20	23
23	17	22	17	21	17	20	17	19	17	18	17	22
23	13	22	13	21	13	20	13	19	13	18	13	21
23	09	22	09	21	09	20	09	19	09	18	09	20
23	04	22	04	21	04	20	04	19	05	18	05	19
22	59	21	59	20	59	19	59	19	00	18	00	18
22	53	21	53	20	53	19	53	18	54	17	54	17
22	47	21	47	20	47	19	47	18	48	17	48	16
22	41	21	41	20	41	19	41	18	42	17	42	15
22	34	21	35	20	35	19	35	18	36	17	36	14
22	27	21	28	20	28	19	28	18	29	17	29	13
22	19	21	20	20	20	19	21	18	21	17	22	12
22	10	21	11	20	11	19	12	18	13	17	13	11
22	02	21	03	20	04	19	04	18	05	17	05	10
21	53	20	54	19	55	18	56	17	56	16	56	9
21	43	20	44	19	45	18	46	17	47	16	46	8
21	33	20	34	19	35	18	36	17	37	16	37	7
21	23	20	24	19	25	18	26	17	27	16	28	6
21	12	20	14	19	15	18	16	17	17	16	18	5
21	01	20	02	19	03	18	04	17	05	16	07	4
20	50	19	51	18	52	17	53	16	54	15	56	3
20	38	19	39	18	40	17	41	16	42	15	44	2
20	26	19	27	18	28	17	29	16	30	15	32	1
20	13	19	14	18	15	17	17	16	18	15	19	♊

20	13	19	14	18	16	17	17	16	18	15	20	30
20	00	19	01	18	03	17	04	16	05	15	07	29
19	47	18	48	17	50	16	51	15	52	14	54	28
19	33	18	35	17	36	16	38	15	39	14	41	27
19	19	18	21	17	22	16	24	15	26	14	27	26
19	05	18	07	17	08	16	10	15	12	14	13	25
18	50	17	52	16	54	15	56	14	58	13	59	24
18	35	17	37	16	39	15	41	14	43	13	44	23
18	20	17	22	16	24	15	26	14	28	13	29	22
18	04	17	06	16	08	15	10	14	12	13	14	21
17	48	16	50	15	52	14	54	13	56	12	58	20
17	32	16	34	15	36	14	38	13	40	12	42	19
17	15	16	17	15	20	14	22	13	24	12	26	18
16	58	16	00	15	03	14	05	13	08	12	10	17
16	41	15	43	14	46	13	48	12	51	11	53	16
16	24	15	26	14	28	13	31	12	34	11	36	15
16	06	15	08	14	11	13	14	12	17	11	19	14
15	48	14	50	13	53	12	56	11	59	11	01	13
15	29	14	32	13	35	12	38	11	41	10	43	12
15	11	14	14	13	17	22	20	11	23	10	25	11
14	52	13	55	12	58	12	01	11	04	10	07	10
14	33	13	36	12	39	11	42	10	45	09	48	9
14	13	13	17	12	20	11	23	10	26	09	29	8
13	54	12	58	12	01	11	04	10	07	09	10	7
13	34	12	38	11	41	10	44	09	48	08	51	6
13	14	12	18	11	21	10	24	09	28	08	31	5
12	54	11	57	11	01	10	04	09	08	08	11	4
12	33	11	36	10	50	09	44	08	47	07	50	3
12	13	11	16	10	20	09	24	08	27	07	31	2
11	52	10	56	10	00	09	04	08	07	07	11	1
11	31	10	35	09	39	08	43	07	46	6	50	♉

A Table of Declinations.

North Latitude.

	0		1		2		3		4		5	
	D	′	D	′	D	′	D	′	D	′	D	′
♍	11	31	12	27	13	23	14	19	15	15	16	11
1	11	09	12	05	13	02	13	57	14	53	15	49
2	10	48	11	45	12	41	13	36	14	32	15	28
3	10	26	11	23	12	19	13	14	14	10	15	06
4	10	05	11	01	11	57	12	52	13	48	14	44
5	9	43	10	39	11	35	12	30	13	26	14	22
6	9	21	10	17	11	13	12	08	13	04	14	00
7	8	58	9	55	10	51	11	46	12	42	13	37
8	8	36	9	32	10	28	11	23	12	19	13	14
9	8	13	9	05	10	09	11	01	11	56	12	51
10	7	51	8	46	9	42	10	38	11	33	12	28
11	7	28	8	23	9	18	10	14	11	09	12	05
12	7	05	8	00	8	56	9	51	10	46	11	42
13	6	42	7	37	8	32	9	28	10	23	11	19
14	6	19	7	14	8	09	9	05	10	00	10	56
15	5	56	6	52	7	47	8	42	9	37	10	33
16	5	33	6	29	7	24	8	19	9	14	10	10
17	5	00	6	05	7	00	7	55	8	50	9	46
18	4	46	5	42	6	36	7	32	8	27	9	22
19	4	22	5	18	6	12	7	08	8	03	8	58
20	3	58	4	54	5	48	6	44	7	39	8	34
21	3	35	4	30	5	25	6	20	7	15	8	10
22	3	11	4	07	5	02	5	57	7	02	7	47
23	2	47	3	43	4	38	5	33	6	28	7	23
24	2	24	3	19	4	14	5	09	6	04	6	59
25	2	00	2	55	3	50	4	45	5	50	6	35
26	1	36	2	31	3	26	4	21	5	16	6	11
27	1	12	2	07	3	02	3	57	4	52	5	47
28	0	48	1	43	2	38	3	33	4	28	5	23
29	0	24	1	19	2	14	3	09	4	04	4	59
30	0	00	0	55	1	50	2	45	3	40	4	35
♎	0	00	0	55	1	50	2	45	3	40	4	35
1	0	24	0	31	1	27	2	21	3	16	4	11
2	0	48	0	07	1	03	1	57	2	52	3	47
3	1	12	0	17	0	39	1	34	2	29	3	24
4	1	36	0	41	0	15	1	10	2	05	3	00
5	2	00	1	05	0	09	0	46	1	41	2	36
6	2	24	1	29	0	34	0	22	1	17	2	02
7	2	47	1	52	0	57	0	02	0	53	1	48
8	3	11	2	16	1	21	0	26	0	29	1	25
9	3	35	2	39	1	44	0	49	0	06	1	02
10	3	58	3	03	2	08	1	13	0	18	0	38
11	4	22	3	27	2	32	1	37	0	41	0	14
12	4	46	3	51	2	55	2	01	1	04	0	10
13	5	09	4	14	3	19	2	24	1	28	0	33
14	5	33	4	38	3	43	2	57	1	52	0	56
15	5	56	5	01	4	06	3	10	2	15	1	19
16	6	19	5	24	4	29	3	32	2	38	1	41
17	6	42	5	46	4	51	3	55	3	00	2	04
18	7	05	6	09	5	14	4	18	3	23	2	27
19	7	28	6	32	5	37	4	41	3	46	2	50
20	7	51	6	55	5	00	5	04	4	08	3	12
21	8	13	7	17	6	22	5	27	4	30	3	34
22	8	36	7	40	6	45	5	50	4	53	3	57
23	8	58	8	03	7	07	6	12	5	15	4	19
24	9	21	8	25	7	30	6	34	5	38	4	42
25	9	43	8	47	7	52	6	56	6	00	5	04
26	10	05	9	09	8	14	7	18	6	22	5	26
27	10	26	9	31	8	35	7	50	6	43	5	47
28	10	48	9	53	8	57	8	01	7	04	6	08
29	11	09	10	14	9	18	8	22	7	25	6	29
30	11	31	10	35	9	39	8	43	7	46	6	50

South Latitude.

0		1		2		3		4		5		
D	′	D	′	D	′	D	′	D	′	D	′	
11	31	10	35	9	39	8	43	7	46	6	50	30
11	09	10	14	9	18	8	22	7	25	6	29	29
10	48	9	53	8	57	8	01	7	04	6	08	28
10	26	9	31	8	35	7	39	6	43	5	47	27
10	05	9	09	8	14	7	18	6	22	5	26	26
9	43	8	47	7	52	6	56	6	00	5	04	25
9	21	8	25	7	30	6	34	5	38	4	42	24
8	58	8	03	7	07	6	11	5	15	4	19	23
8	36	7	40	6	44	5	49	4	53	3	57	22
8	13	7	17	6	21	5	26	4	30	3	34	21
7	51	6	55	5	59	5	04	4	08	3	12	20
7	28	6	32	5	37	4	41	3	46	2	50	19
7	05	6	09	5	14	4	18	3	23	2	27	18
6	42	5	46	4	51	3	55	3	00	2	04	17
6	19	5	23	4	28	3	32	2	37	1	41	16
5	56	5	00	4	05	3	10	2	15	1	19	15
5	33	4	37	3	41	2	57	1	52	0	56	14
5	00	4	14	3	19	2	24	1	29	0	33	13
4	46	3	51	2	56	2	01	1	05	0	10	12
4	22	3	27	2	32	1	37	0	41	0	14	11
3	58	3	03	2	08	1	13	0	18	0	38	10
3	35	2	29	1	44	0	49	0	06	1	02	9
3	11	2	16	1	21	0	26	0	29	1	25	8
2	47	1	52	0	57	0	02	0	53	1	48	7
2	24	1	28	0	33	0	22	1	17	2	12	6
2	00	1	05	0	09	0	46	1	41	2	36	5
1	36	0	41	0	15	1	10	2	05	3	00	4
1	12	0	17	0	39	1	34	2	29	3	24	3
0	48	0	07	1	03	1	57	2	52	3	47	2
0	24	0	31	1	27	2	21	3	16	4	11	1
0	00	0	55	1	50	2	45	3	40	4	35	♈
0	00	0	55	1	50	2	45	3	40	4	35	30
0	24	1	19	2	14	3	09	4	04	4	59	29
0	48	1	43	2	38	3	33	4	28	5	23	28
1	12	2	07	3	02	3	57	4	52	5	47	27
1	36	2	31	3	26	4	21	5	16	6	11	26
2	00	2	55	3	50	4	45	5	50	6	35	25
2	24	3	19	4	14	5	09	6	04	6	59	24
2	47	3	43	4	38	5	33	6	28	7	23	23
3	11	4	07	5	02	5	57	6	02	7	47	22
3	35	4	30	5	25	6	20	7	15	8	10	21
3	58	4	54	5	48	6	44	7	39	8	34	20
4	22	5	18	6	12	7	08	8	03	8	58	19
4	46	5	42	6	36	7	32	8	27	9	22	18
5	09	6	05	7	00	7	55	8	50	9	46	17
5	33	6	29	7	24	8	19	9	14	10	10	16
5	56	6	52	7	47	8	42	9	37	10	33	15
6	19	7	14	8	09	9	05	10	00	10	56	14
6	42	7	37	8	32	9	28	10	23	11	19	13
7	05	8	00	8	56	9	51	10	46	11	42	12
7	28	8	23	9	18	10	14	11	09	12	05	11
7	51	8	46	9	42	10	38	11	33	12	28	10
8	13	9	05	10	09	11	01	11	56	12	51	9
8	36	9	32	10	28	11	23	12	19	13	14	8
8	58	9	55	10	51	11	46	12	42	13	37	7
9	21	10	17	11	13	12	08	13	04	14	00	6
9	43	10	39	11	35	12	30	13	26	14	22	5
10	05	11	01	11	57	12	52	13	48	14	44	4
10	26	11	23	12	19	13	14	14	10	15	06	3
10	48	11	45	12	41	13	36	14	32	15	28	2
11	09	12	05	13	02	13	57	14	53	15	49	1
11	31	12	27	13	23	14	19	15	15	16	11	♓

A Table of Declinations.

North Latitude.

	0		1		2		3		4		5	
	D	′	D	′	D	′	D	′	D	′	D	′
♏	11	31	10	35	09	39	08	43	07	46	06	50
1	11	52	10	56	10	00	09	04	08	07	07	11
2	12	13	11	17	10	20	09	24	08	28	07	31
3	12	33	11	37	10	40	09	44	08	48	07	51
4	12	54	11	58	11	01	10	04	09	08	08	11
5	13	14	12	18	11	21	10	24	09	28	08	31
6	13	34	12	38	11	41	10	44	09	48	08	51
7	13	54	12	58	12	01	11	04	10	07	09	10
8	14	14	13	17	12	20	11	23	10	26	09	29
9	14	33	13	36	12	39	11	42	10	45	09	48
10	14	52	13	55	12	58	12	01	11	04	10	07
11	15	11	14	14	13	17	12	20	11	23	10	25
12	15	29	14	32	13	35	12	38	11	41	10	43
13	15	48	14	50	13	53	12	56	12	59	11	01
14	16	06	15	08	14	11	13	14	12	17	11	19
15	16	24	15	26	14	29	13	31	12	34	11	36
16	16	41	15	43	14	46	13	48	12	51	11	53
17	16	58	16	00	15	03	14	05	13	08	12	10
18	17	15	16	17	15	20	14	22	13	24	12	26
19	17	32	16	34	15	36	14	38	13	40	12	42
20	17	48	16	50	15	52	14	54	13	56	12	58
21	18	04	17	06	16	08	15	10	14	12	13	14
22	18	20	17	22	16	24	15	26	14	28	13	29
23	18	35	17	37	16	39	15	41	14	43	13	44
24	18	50	17	52	16	54	15	56	14	58	13	59
25	19	05	18	07	17	09	16	10	15	12	14	13
26	19	19	18	21	17	23	16	25	15	26	14	27
27	19	33	18	35	17	36	16	38	15	39	14	41
28	19	47	18	48	17	50	16	51	15	52	14	54
29	20	00	19	01	18	03	17	04	16	05	15	07
30	20	13	19	14	18	16	17	17	16	17	15	20
♐	20	13	19	14	18	16	17	17	16	18	15	20
1	20	26	19	27	18	28	17	29	16	30	15	32
2	20	38	19	39	18	40	17	41	16	42	15	44
3	20	50	19	51	18	52	17	53	16	54	15	55
4	21	01	20	02	19	03	18	04	17	06	16	07
5	21	13	20	13	19	15	18	16	17	17	16	18
6	21	23	20	24	19	25	18	26	17	27	16	28
7	21	33	20	34	19	35	18	36	17	37	16	38
8	21	43	20	44	19	45	18	46	17	47	16	47
9	21	53	20	54	19	55	18	56	17	56	16	57
10	22	02	21	03	20	04	19	05	18	05	17	06
11	22	10	21	11	20	12	19	13	18	13	17	14
12	22	19	21	19	20	20	19	21	18	21	17	22
13	22	27	21	27	20	28	19	28	18	29	17	29
14	22	34	21	35	20	35	19	35	18	36	17	36
15	22	41	21	41	20	41	19	41	18	42	17	42
16	22	47	21	47	20	47	19	47	18	48	17	48
17	22	53	21	53	20	53	19	53	18	54	17	54
18	22	59	21	59	20	59	19	59	19	00	18	00
19	23	04	22	04	21	04	20	04	19	05	18	05
20	23	09	22	09	21	09	20	09	19	10	18	10
21	23	13	22	13	21	13	20	13	19	14	18	14
22	23	17	22	17	21	17	20	17	19	17	18	17
23	23	20	22	20	21	20	20	20	19	20	18	20
24	23	23	22	23	21	23	20	23	19	23	18	23
25	23	26	22	26	21	26	20	26	19	26	18	26
26	23	28	22	28	21	28	20	28	19	28	18	28
27	23	30	22	30	21	30	20	30	19	30	18	30
28	23	30	22	31	21	31	20	31	19	31	18	31
29	23	31	22	31	21	31	20	31	19	31	18	31
30	23	31	22	31	21	31	20	31	19	31	18	31

South Latitude.

0		1		2		3		4		5		
D	′	D	′	D	′	D	′	D	′	D	′	
11	31	12	27	13	23	14	19	15	15	16	11	30
11	52	12	48	13	44	14	40	15	36	16	33	29
12	13	13	09	14	05	15	01	15	57	16	54	28
12	33	13	29	14	25	15	21	16	18	17	14	27
12	54	13	50	14	46	15	42	16	39	17	35	26
13	14	14	11	15	07	16	03	17	00	17	56	25
13	34	14	31	15	27	16	24	17	20	18	17	24
13	54	14	51	15	47	16	44	17	40	18	37	23
14	14	15	11	16	07	17	04	18	00	18	57	22
14	33	15	30	16	26	17	23	18	20	19	17	21
14	52	15	49	16	45	17	42	18	39	19	36	20
15	11	16	08	17	04	18	01	18	58	19	55	19
15	29	16	26	17	23	18	20	19	17	20	14	18
15	48	16	45	17	42	18	39	19	36	20	33	17
16	06	17	03	18	00	18	57	19	54	20	52	16
16	24	17	21	18	18	19	15	20	12	21	10	15
16	41	17	38	18	36	19	33	20	30	21	38	14
16	58	17	55	18	53	19	51	20	48	21	46	13
17	15	18	12	19	10	20	08	21	05	22	03	12
17	32	18	29	19	27	20	25	21	22	22	20	11
17	48	18	46	19	44	20	41	21	39	22	37	10
18	04	19	02	20	00	20	57	21	55	22	53	9
18	20	19	18	20	16	21	13	22	11	23	09	8
18	35	19	34	20	32	21	29	22	27	23	25	7
18	50	19	49	20	47	21	45	22	43	23	41	6
19	05	20	03	21	02	22	00	22	58	23	56	5
19	19	20	17	21	16	22	14	23	12	24	11	4
19	33	20	31	21	30	22	28	23	26	24	25	3
19	47	20	45	21	44	22	42	23	40	24	39	2
20	00	20	59	21	57	22	56	23	54	24	53	1
20	13	21	12	22	10	23	09	24	07	25	06	♒
20	13	21	12	22	10	23	09	24	07	25	06	30
20	26	21	25	22	23	23	22	24	20	25	19	29
20	38	21	37	22	36	23	35	24	33	25	32	28
20	50	21	49	22	48	23	47	24	45	25	44	27
21	01	22	00	22	59	23	58	24	57	25	55	26
21	12	22	11	23	10	24	09	25	08	26	07	25
21	23	22	22	23	21	24	20	25	19	26	18	24
21	33	22	32	23	31	24	31	25	30	26	29	23
21	43	22	42	23	41	24	41	25	40	26	39	22
21	53	22	52	23	51	24	51	25	50	26	49	21
22	02	23	01	24	00	25	00	25	59	26	58	20
22	11	23	10	24	09	25	09	26	08	27	07	19
22	19	23	19	24	18	25	18	26	17	27	16	18
22	27	23	27	24	26	25	26	26	25	27	24	17
22	34	23	34	24	33	25	33	26	32	27	31	16
22	41	23	41	24	40	25	39	26	39	27	38	15
22	47	23	47	24	46	25	45	26	45	27	45	14
22	53	23	53	24	53	25	52	26	52	27	52	13
22	59	23	59	24	59	25	58	26	58	27	58	12
23	04	24	04	25	04	26	03	27	03	28	03	11
23	09	24	09	25	09	26	08	27	08	28	08	10
23	13	24	13	25	13	26	13	27	12	28	12	9
23	17	24	17	25	17	26	17	27	16	28	16	8
23	20	24	20	25	20	26	20	27	19	28	19	7
23	23	24	23	25	23	26	23	27	22	28	22	6
23	26	24	26	25	26	26	26	27	25	28	25	5
23	28	24	28	25	28	26	28	27	28	28	28	4
23	30	24	30	25	30	26	30	27	30	28	30	3
23	31	24	31	25	31	26	31	27	31	28	31	2
23	31	24	31	25	31	26	31	27	31	28	31	1
23	31	24	31	25	31	26	31	27	31	28	31	♑

A Table of the Oblique Aſcenſions of all the points of the Ecliptique, for the Latitude of $51^{d}\ 32'$

Deg.	♈		♉		♊		♋		♌		♍		♎		♏		♐		♑		♒		♓	
	D	′	D	′	D	′	D	′	D	′	D	′	D	′	D	′	D	′	D	′	D	′	D	′
0	0	0	13	4	30	12	56	48	94	36	137	15	180	0	222	45	265	24	303	12	329	48	346	56
1	0	24	13	32	30	54	57	54	95	56	138	42	181	25	224	10	266	47	304	17	330	29	347	25
2	0	49	14	1	31	38	59	1	97	24	140	8	182	50	225	36	268	9	305	21	331	11	347	53
3	1	14	14	30	32	21	60	8	98	46	141	34	184	15	227	2	269	32	306	24	331	51	348	21
4	1	39	15	1	33	6	61	16	100	10	143	0	185	40	228	28	370	54	307	27	332	30	348	49
5	2	4	15	30	33	50	62	25	101	35	144	26	187	6	229	54	272	16	308	29	333	9	349	16
6	2	29	16	0	34	35	63	35	102	59	145	52	188	30	231	20	273	37	309	30	333	47	349	44
7	2	54	16	31	35	22	64	46	104	23	147	17	189	56	232	46	274	57	310	30	334	25	350	11
8	3	19	17	2	36	8	65	57	105	48	148	43	191	21	234	13	276	17	311	29	335	2	350	38
9	3	45	17	33	36	57	67	10	107	13	150	9	192	46	235	39	277	36	312	27	335	40	351	5
10	4	10	18	5	37	46	68	22	108	38	151	34	194	12	237	5	278	56	313	24	336	17	351	32
11	4	36	18	37	38	35	69	35	110	3	153	0	195	37	238	32	280	14	314	21	336	52	351	58
12	5	1	19	10	39	26	70	49	111	29	154	25	197	2	239	57	281	32	315	16	337	27	352	25
13	5	26	19	42	40	16	72	3	112	54	155	51	198	28	241	23	282	51	316	11	338	2	352	51
14	5	52	20	14	41	8	73	19	114	21	157	16	199	53	242	49	284	8	317	6	338	38	353	17
15	6	17	20	48	42	1	74	35	115	46	158	44	201	16	244	14	285	25	317	59	339	12	353	43
16	6	43	21	22	42	54	75	52	117	11	160	7	202	44	245	39	286	41	318	52	339	46	354	8
17	7	9	21	58	43	49	77	9	118	37	161	32	204	9	247	6	287	57	319	44	340	18	354	34
18	7	35	22	33	44	44	78	28	120	3	162	58	205	35	248	31	289	11	320	34	340	50	354	59
19	8	2	23	8	45	39	79	46	121	28	164	23	207	0	249	57	290	25	321	25	341	23	355	24
20	8	28	23	43	46	36	81	4	122	55	165	48	208	26	251	22	291	38	322	14	341	55	355	50
21	8	55	24	20	47	33	82	24	124	21	167	14	209	51	152	47	292	50	323	3	342	27	356	15
22	9	22	24	58	48	31	83	43	125	47	168	39	211	17	254	12	294	3	323	52	342	58	356	41
23	9	49	25	35	49	30	85	3	127	14	170	4	212	43	255	37	295	14	324	38	343	29	357	6
24	10	16	26	13	50	30	86	23	128	40	171	30	214	8	257	1	296	25	325	25	344	0	357	31
25	10	44	26	51	51	31	87	44	130	6	172	54	215	34	258	25	297	35	326	10	344	30	357	56
26	11	11	27	30	52	33	89	6	131	32	174	20	217	0	259	50	298	44	326	54	344	59	358	21
27	11	39	28	9	53	36	90	28	232	58	175	45	218	26	261	14	299	52	327	39	345	31	358	46
28	12	7	28	49	54	39	91	51	134	24	177	10	219	52	262	36	300	59	328	22	345	59	359	11
29	12	35	29	31	55	43	93	13	135	50	178	35	221	18	264	1	302	6	329	6	346	28	359	36
30	13	4	30	12	56	48	94	36	137	15	180	0	222	45	255	24	303	12	329	48	346	56	360	0

Enter this Table, finding the *Sign* on the Head, and the Degree in the firſt Row on the left hand, and the common Angle will ſhew the Oblique Aſcenſion of the point given in the Latitude of *London*.

A Table of Right Aſcenſions.

	North Latitude.												*South Latitude.*											
	0		1		2		3		4		5		0		1		2		3		4		5	
	D	'	D	'	D	'	D	'	D	'	D	'	D	'	D	'	D	'	D	'	D	'	D	'
♎ ♈	0	00	359	37	359	13	358	49	358	25	358	01	0	00	0	23	0	47	1	11	1	35	1	59
1	0	55	0	32	0	08	359	44	359	20	358	56	0	55	1	18	5	42	2	06	2	30	2	54
2	1	50	1	27	1	03	0	39	0	15	359	51	1	50	2	13	2	37	3	01	3	25	3	49
3	2	45	2	22	1	58	1	34	1	10	0	46	2	45	3	08	3	32	3	56	4	20	4	44
4	3	40	3	17	2	53	2	29	2	05	1	41	3	40	4	03	4	27	4	51	5	15	5	39
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♏ ♉	27	54	27	33	27	11	26	49	26	27	26	05	27	54	28	16	29	37	28	58	29	19	29	4
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26	53	40	53	24	53	09	52	54	52	38	52	22	53	4	53	55	54	09	54	24	54	38	54	53
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29	56	46	56	32	56	18	56	03	55	49	55	34	56	46	57	00	57	13	57	27	57	41	57	54
30	57	48	57	35	57	21	57	07	56	53	56	38	57	48	58	02	58	15	58	29	58	42	58	55

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North Latitude.

	0		1		2		3		4		5	
	D	′	D	′	D	′	D	′	D	′	D	′
♊	57	48	57	35	57	21	57	07	56	53	56	38
1	58	51	58	38	58	24	58	10	57	57	57	42
2	59	53	59	41	59	27	59	14	59	01	58	47
3	60	56	60	44	60	31	60	18	60	05	59	52
4	61	59	61	47	61	35	61	22	61	10	60	57
5	63	03	62	51	62	39	62	27	62	15	62	02
6	64	06	63	55	63	43	63	32	63	20	63	08
7	65	09	64	59	64	47	64	37	64	25	64	13
8	66	13	66	03	65	52	65	42	65	30	65	19
9	67	17	67	07	66	57	66	47	66	36	66	25
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12	70	29	70	21	70	12	70	03	69	54	69	45
13	71	34	71	26	71	17	71	09	71	00	70	51
14	72	38	72	31	72	22	72	15	72	06	71	58
15	73	42	73	36	73	28	73	21	73	19	73	05
16	74	47	74	41	74	33	74	27	74	19	74	12
17	75	52	75	46	75	39	75	33	75	26	75	19
18	76	57	76	51	76	45	76	39	76	33	76	27
19	78	02	77	56	77	51	77	45	77	40	77	34
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21	80	12	80	08	80	03	79	59	79	54	79	49
22	81	17	81	13	81	09	81	05	81	01	80	56
23	82	22	82	18	82	15	82	11	82	08	82	04
24	83	28	83	24	83	21	83	18	83	15	83	12
25	84	33	84	30	84	27	84	25	84	22	84	20
26	85	38	85	36	85	33	85	32	85	29	85	28
27	86	44	86	42	86	40	86	39	86	37	86	36
28	87	49	87	48	87	46	87	46	87	44	87	44
29	88	55	88	54	88	53	88	53	88	52	88	52
30	90	00	90	00	90	00	90	00	90	00	90	00
♋	090	00	090	00	090	00	90	00	90	00	090	00
1	091	05	091	06	091	07	91	07	091	07	091	08
2	092	11	092	12	092	14	92	14	92	15	092	16
3	093	16	093	18	93	20	093	21	093	23	093	24
4	094	22	094	24	094	27	094	28	094	30	094	32
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6	096	32	096	36	96	39	96	42	096	45	096	48
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14	105	13	105	19	105	27	105	33	105	40	105	48
15	106	17	106	24	106	33	106	39	106	47	106	55
16	107	22	107	29	107	38	107	45	107	53	108	02
17	108	26	108	34	108	43	108	51	108	59	109	09
18	109	31	109	39	109	48	109	57	110	05	110	15
19	110	35	110	44	110	53	111	03	111	12	111	22
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21	112	43	112	53	113	03	113	13	113	24	113	35
22	113	47	113	57	114	08	114	18	114	30	114	41
23	114	51	115	01	115	13	115	23	115	35	115	47
24	115	54	116	05	116	17	116	28	116	41	116	52
25	116	57	117	09	117	21	117	33	117	46	117	58
26	118	01	118	13	118	25	118	38	118	51	119	03
27	119	04	119	16	119	29	119	42	119	55	120	08
28	120	07	120	19	120	33	120	46	120	59	121	13
29	121	09	121	22	121	36	121	50	122	03	122	18
30	122	12	122	25	122	39	122	53	123	07	123	22

South Latitude.

0		1		2		3		4		5	
D	′	D	′	D	′	D	′	D	′	D	′
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58	51	59	04	59	17	59	30	59	43	59	55
59	53	60	06	60	19	60	31	60	44	60	56
60	56	61	09	61	21	61	33	61	46	61	57
61	59	62	11	62	23	62	35	62	48	62	58
63	03	63	14	63	25	63	37	63	50	63	59
64	06	64	17	64	28	64	39	64	52	65	01
65	09	65	20	65	31	65	41	65	54	66	02
66	13	66	23	66	34	66	44	66	56	67	04
67	17	67	27	67	37	67	46	67	58	68	06
68	21	68	30	68	40	68	49	68	59	69	07
69	25	69	34	69	43	69	52	70	01	70	09
70	29	70	38	70	46	70	55	71	03	71	11
71	34	71	42	71	49	71	58	72	05	72	13
72	38	72	46	72	53	73	01	73	08	73	15
73	43	73	50	73	57	74	04	74	11	74	18
74	47	74	54	75	01	75	07	75	14	75	20
75	52	75	58	76	05	76	11	76	17	76	23
76	57	77	03	77	09	77	15	77	20	77	26
78	02	78	07	78	13	78	18	78	23	78	28
79	07	79	12	79	17	79	21	79	26	79	31
80	12	80	17	80	21	80	25	80	29	80	34
81	17	81	21	81	25	81	28	81	32	81	36
82	22	82	25	82	29	82	32	82	35	82	39
83	28	83	30	83	33	83	36	83	39	83	42
84	33	84	35	84	37	84	40	84	42	84	45
85	38	85	40	85	41	85	44	85	45	85	48
86	44	86	45	86	46	86	48	86	49	86	51
87	49	87	50	87	50	87	52	87	52	87	54
88	55	88	55	88	55	88	56	88	56	88	57
90	00	90	00	90	00	90	00	90	00	90	00
090	00	090	00	090	00	090	00	090	00	090	00
091	05	091	05	091	05	091	04	091	04	91	04
092	11	092	10	092	10	092	08	092	07	092	07
093	16	093	15	093	14	093	12	093	11	093	11
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095	27	095	25	095	23	095	20	095	18	95	18
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114	51	114	40	114	29	114	19	114	08	114	08
115	54	115	43	115	32	115	21	115	10	115	10
116	57	116	46	116	35	116	23	116	12	116	12
118	01	117	49	117	37	117	25	117	14	117	14
119	04	118	51	118	39	118	27	118	15	118	15
120	07	119	54	119	41	119	29	119	16	119	16
120	09	120	56	120	43	120	30	120	17	120	17
122	12	121	58	121	45	121	31	121	18	121	18

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	North Latitude.						South Latitude.					
	0	1	2	3	4	5	0	1	2	3	4	5
	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′
♌	122 12	122 25	122 39	122 53	123 07	123 22	122 12	121 58	121 45	121 31	121 18	121 05
1	123 14	123 28	123 42	123 57	124 11	124 26	123 14	123 0	122 47	122 33	122 19	122 06
2	124 16	124 31	124 45	125 00	125 15	125 30	124 16	124 02	123 48	123 34	123 20	123 06
3	125 18	125 33	125 48	126 03	126 18	126 34	125 19	125 03	124 49	124 35	124 21	124 07
4	126 20	126 36	126 51	127 06	127 22	127 38	126 20	126 05	125 51	125 36	125 22	125 07
5	127 22	127 38	127 54	128 09	128 25	128 42	127 22	127 07	126 52	126 36	126 22	126 07
6	128 24	128 40	128 56	129 12	129 28	129 45	128 24	128 08	127 53	127 37	127 22	127 07
7	129 25	129 42	129 58	130 14	130 31	130 48	129 25	129 09	128 54	128 37	128 22	128 07
8	130 26	130 43	131 00	131 16	131 33	131 51	130 26	130 10	129 54	129 37	129 22	129 06
9	131 27	131 44	132 01	132 18	132 35	132 53	131 27	131 10	130 54	130 37	130 21	130 05
10	132 28	132 45	133 02	133 20	133 37	133 55	132 28	132 11	131 54	131 37	131 21	131 04
11	133 28	133 46	134 03	134 21	134 39	134 57	133 28	133 11	132 54	132 37	132 20	132 03
12	134 29	334 47	135 04	135 22	135 40	135 59	134 29	134 11	133 54	133 37	133 19	133 02
13	135 29	135 47	136 05	136 23	136 41	137 00	135 29	135 11	134 54	134 36	134 18	134 01
14	136 29	136 47	137 06	137 24	137 42	138 01	136 29	136 11	135 53	135 35	135 17	135 00
15	137 29	137 47	138 06	138 24	138 43	139 02	137 29	137 10	136 52	136 34	136 16	135 58
16	138 29	138 47	139 06	139 25	139 44	140 03	138 29	138 10	137 51	137 33	137 15	136 57
17	139 28	139 47	140 06	140 25	140 45	141 04	139 28	139 09	138 50	138 32	138 14	137 55
18	140 28	140 46	141 06	141 25	141 45	142 05	140 27	140 08	139 49	139 30	139 13	138 53
19	141 27	141 46	142 06	142 25	142 45	143 06	141 27	141 07	140 48	140 29	140 10	139 51
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21	143 25	143 44	144 04	144 24	144 45	145 06	143 24	143 04	142 45	142 25	142 06	141 47
22	144 23	144 43	145 03	145 24	145 45	146 06	144 23	144 03	143 43	143 23	143 04	142 45
23	145 22	145 42	146 02	146 23	146 44	147 05	145 22	145 01	144 41	144 21	144 02	143 42
24	146 20	146 40	147 01	147 22	147 43	148 04	146 20	145 59	145 39	145 19	144 59	144 39
25	147 18	147 39	148 00	148 21	148 42	149 03	147 18	146 57	146 37	146 17	145 56	145 36
26	148 16	148 37	148 58	149 19	149 41	150 02	148 16	147 55	147 35	147 14	146 53	146 33
27	149 14	149 35	149 56	150 17	150 39	151 01	149 14	148 53	148 32	148 11	147 50	147 29
28	150 11	150 33	150 54	151 15	151 37	151 59	150 11	149 50	149 29	149 08	148 47	148 26
29	151 09	151 30	151 52	152 13	152 35	152 57	151 09	150 47	150 26	150 05	149 44	149 23
30	152 06	152 27	152 49	153 11	153 33	153 55	152 06	151 44	151 23	151 02	150 41	150 20

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♍	152 06	152 27	152 49	153 11	153 33	153 55	152 06	151 44	151 23	151 02	150 41	150 20
1	153 04	153 25	153 47	154 09	154 31	154 53	153 04	152 41	152 20	151 59	151 38	151 16
2	154 01	154 22	154 44	155 06	155 29	155 51	154 01	153 38	153 17	152 55	152 34	152 12
3	154 58	155 19	155 41	156 03	156 26	156 49	154 58	154 35	154 13	153 51	153 30	153 08
4	155 54	156 16	156 39	157 01	157 24	157 47	155 54	155 32	155 10	154 48	154 26	154 04
5	156 51	157 13	157 36	157 58	158 21	158 44	156 51	156 29	156 07	155 44	155 22	155 00
6	157 47	158 10	158 33	158 55	159 18	159 41	157 48	157 25	157 03	156 40	156 18	155 56
7	158 44	159 07	159 30	159 52	160 15	160 38	158 44	158 22	157 59	157 36	157 14	156 52
8	159 40	160 04	160 27	160 49	161 12	161 35	159 40	159 18	158 55	158 32	158 10	157 48
9	160 37	161 00	161 23	161 46	162 09	162 32	160 37	160 14	159 51	159 28	159 06	158 43
10	161 33	161 56	162 19	162 42	163 06	163 29	161 33	161 1	160 47	160 24	160 02	159 39
11	162 29	162 52	163 15	163 38	164 02	164 25	162 29	162 06	161 43	161 20	160 58	160 35
12	163 25	163 48	164 11	164 34	164 58	165 21	163 25	163 02	162 39	162 16	161 53	161 30
13	164 20	164 44	165 07	165 30	165 54	166 18	164 20	163 58	163 35	163 12	162 49	162 25
14	165 16	165 4	166 06	166 26	166 50	167 14	165 16	164 53	164 30	164 07	163 44	163 20
15	166 12	166 35	166 59	167 22	167 46	168 1	166 12	165 48	165 25	165 02	164 39	164 15
16	167 07	167 31	167 55	168 18	168 42	169 06	167 07	166 44	166 21	165 57	165 34	165 10
17	168 03	168 27	168 51	169 14	169 38	170 02	168 03	167 4	167 17	165 52	166 29	166 05
18	168 58	169 23	169 46	170 09	170 33	170 57	168 58	168 35	168 12	167 47	167 24	167 00
19	169 54	170 18	170 42	171 05	171 29	171 53	169 54	169 31	169 07	168 43	168 19	167 55
20	170 49	171 13	171 37	172 01	172 25	172 49	170 49	170 26	170 02	169 38	169 14	168 50
21	171 44	172 08	172 32	172 56	173 20	173 44	171 44	171 21	170 57	170 33	170 09	169 45
22	172 39	173 0	173 27	173 51	174 15	174 39	172 39	172 16	171 52	171 28	171 04	170 40
23	173 35	173 58	174 22	174 46	175 10	175 34	173 35	173 11	172 47	172 23	171 59	171 35
24	174 30	174 53	175 17	175 41	176 05	176 29	174 30	174 06	173 42	173 18	172 54	172 30
25	175 25	175 48	176 12	176 36	177 00	177 24	175 25	175 02	174 38	174 14	173 50	173 26
26	176 20	176 43	177 07	177 31	177 55	178 19	176 20	175 57	175 33	175 09	174 45	174 21
27	177 15	177 38	178 02	178 26	178 50	179 14	177 15	176 52	176 28	176 04	175 4	175 16
28	178 10	178 33	178 57	179 21	179 45	180 09	178 10	177 47	177 23	176 59	176 35	176 11
29	179 05	179 28	179 52	180 16	180 4	181 04	179 05	178 42	178 18	177 54	177 30	177 06
30	180 00	180 23	180 47	181 11	181 35	181 59	180 0	179 37	179 19	178 49	178 25	178 01

A Table of the Oblique Aſcenſions of the *Ecliptique*, from 0. to 76 degrees of Latitude.

Elevation of the Pole

		1		2		3		4		5		6		7		8		9		10	
S	D	D	′	D	′	D	′	D	′	D	′	D	′	D	′	D	′	D	′	D	′
♈	0	000	00	000	00	000	00	000	00	000	00	000	00	000	00	000	00	000	00	000	00
	4	003	38	003	36	003	35	003	33	003	32	003	29	003	28	003	26	003	24	003	23
	8	007	17	007	14	007	10	007	07	007	04	007	00	006	57	006	53	006	50	006	47
	12	010	57	010	52	010	46	010	41	010	26	010	52	010	26	010	21	010	16	010	11
	16	014	37	014	30	014	23	014	17	014	10	014	04	013	57	013	50	013	43	013	36
	20	018	19	018	10	018	02	017	54	017	46	017	37	017	29	017	20	017	12	017	03
	24	022	03	021	52	021	42	021	33	021	23	021	13	021	03	020	52	020	43	020	32
	28	025	48	025	37	025	25	025	14	025	03	024	50	024	39	024	28	024	16	024	04
♉	2	029	36	029	23	029	10	028	57	028	44	028	30	028	18	028	04	027	51	027	38
	6	033	26	033	11	032	57	032	43	032	27	032	13	031	59	031	43	031	29	031	14
	10	037	19	037	03	036	47	036	31	036	15	035	59	035	43	035	27	035	11	034	54
	14	041	14	040	57	040	39	040	22	040	05	039	47	039	30	039	12	038	55	038	37
	18	045	13	044	54	044	36	044	17	043	59	043	40	043	21	043	02	042	43	042	24
	22	049	15	048	54	048	35	048	15	047	55	047	35	047	15	046	55	046	34	046	14
	26	053	18	052	57	052	37	052	16	051	54	051	33	051	12	050	50	050	29	050	07
♊	0	057	26	057	04	056	42	056	20	055	57	055	35	055	12	054	50	054	28	054	05
	4	061	37	061	13	060	50	060	28	060	04	059	41	059	17	458	54	058	31	058	07
	8	065	50	065	25	065	02	064	38	064	13	063	50	063	25	063	02	062	37	062	12
	12	070	05	069	40	069	16	068	51	068	26	068	01	067	36	067	12	066	47	066	21
	16	074	22	073	57	073	32	073	07	072	41	072	16	071	51	071	25	070	59	070	32
	20	078	41	078	16	077	50	077	24	076	59	076	33	076	07	075	41	075	13	074	48
	24	083	01	082	36	082	10	081	44	081	18	080	52	080	25	079	59	079	32	079	05
	28	087	23	086	57	086	31	086	04	085	38	085	12	084	45	084	19	083	52	083	25
♋	2	091	45	091	19	090	53	090	27	090	01	089	35	089	07	088	41	088	14	087	47
	6	096	07	095	41	095	15	094	48	094	23	093	57	093	29	093	03	092	36	092	10
	10	100	27	100	02	099	36	099	10	098	45	098	19	097	53	097	27	097	00	096	34
	14	104	47	104	22	103	57	103	32	103	06	102	41	102	16	101	50	101	24	100	57
	18	109	06	108	41	108	17	107	52	107	27	107	03	106	38	106	13	105	48	105	22
	22	113	23	112	58	112	35	112	11	111	47	111	23	110	58	110	35	110	10	109	46
	26	117	38	117	14	116	51	116	28	116	05	115	42	115	18	114	55	114	32	114	08
♌	0	121	50	121	28	121	06	120	44	120	21	119	59	119	36	119	14	118	52	118	29
	4	125	59	125	38	125	18	124	56	124	35	124	14	123	52	123	31	123	10	122	48
	8	130	06	129	45	129	26	129	06	128	46	128	26	128	06	127	46	127	25	127	04
	12	134	10	133	51	133	32	133	14	132	55	132	36	132	18	131	58	131	39	131	20
	16	138	11	137	54	137	37	137	19	137	02	136	45	136	27	136	09	135	52	135	34
	20	142	09	141	53	141	37	141	21	141	05	140	49	140	33	140	17	140	01	139	45
	24	146	05	145	51	145	37	145	22	145	07	144	51	144	38	144	23	144	09	143	54
	28	149	58	149	46	149	32	149	19	149	06	148	52	148	40	148	27	148	13	148	01
♍	2	153	49	153	38	153	26	153	15	153	03	152	51	152	40	152	28	152	17	152	05
	6	157	38	157	28	157	18	157	08	156	59	156	48	156	39	156	28	156	18	156	08
	10	161	25	161	16	161	08	161	00	160	52	160	43	160	35	160	26	160	18	160	09
	14	165	10	165	04	164	56	164	50	164	44	164	37	164	30	164	23	164	16	164	09
	18	168	54	168	49	168	34	168	38	168	34	168	29	168	24	168	18	168	13	168	08
	22	172	37	172	33	172	30	172	26	172	23	172	20	172	16	172	13	172	09	172	06
	26	176	19	176	17	176	16	176	14	176	12	176	10	176	08	176	07	176	05	176	04
♎	0	180	00	180	00	180	00	180	00	180	00	180	00	180	00	180	00	180	00	180	09

A Table of the Oblique Aſcenſions of the *Ecliptique*, from 0. to 67 degrees of Latitude.

Elevation of the Pole.

	1	2	3	4	5	6	7	8	9	10
S D	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′
♎ 0	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00
4	183 41	183 43	183 44	183 46	183 48	183 50	183 52	183 53	183 55	183 56
8	187 23	187 27	187 30	187 34	187 37	187 40	187 44	187 47	187 51	187 54
12	191 06	191 11	191 17	191 22	191 26	191 31	191 36	191 42	191 47	191 52
16	194 50	194 56	195 04	195 10	195 16	195 23	195 30	195 37	195 44	195 51
20	198 35	198 44	198 52	199 00	199 08	199 17	199 25	199 34	199 43	199 51
24	202 22	202 30	202 42	202 52	203 01	203 12	203 21	203 32	203 42	203 52
28	206 11	206 22	206 34	206 45	206 57	207 09	207 20	207 32	207 42	207 55
♏ 2	210 02	210 14	210 28	210 41	210 54	211 08	211 20	211 33	211 46	211 59
6	213 55	214 09	214 23	214 38	214 53	215 09	215 22	215 37	215 51	216 06
10	217 51	218 07	218 23	218 39	218 55	119 11	219 27	219 43	219 59	220 15
14	221 49	222 06	222 23	222 41	222 58	223 15	223 33	223 51	224 08	224 26
18	225 50	226 09	226 28	226 46	227 05	227 24	227 42	228 02	228 21	228 40
22	229 54	230 15	230 34	230 54	231 14	231 34	231 54	232 14	232 35	232 56
26	234 01	234 22	234 42	235 04	235 25	235 46	236 08	236 29	236 50	237 12
♐ 0	238 10	238 32	238 54	239 16	239 39	240 01	240 24	240 46	241 08	241 31
4	242 22	242 46	243 09	243 32	243 55	244 18	244 42	245 05	245 25	245 52
8	246 37	247 02	247 25	247 49	248 13	248 37	249 02	249 25	249 50	250 14
12	250 54	251 19	251 43	252 08	252 33	252 57	253 22	253 47	254 12	254 38
16	255 13	255 38	256 03	256 28	256 54	257 19	257 44	258 10	258 36	359 02
20	259 33	259 58	260 24	260 50	261 15	261 41	262 07	262 33	263 00	263 26
24	263 53	264 19	264 45	265 12	265 37	266 03	266 31	266 57	267 24	267 50
28	268 15	268 41	269 07	269 33	269 59	270 25	270 53	271 19	271 46	272 13
♑ 2	272 37	273 03	273 29	273 56	274 22	274 48	275 15	275 41	276 08	276 35
6	276 59	277 24	277 50	278 16	278 42	279 08	279 35	280 01	280 28	280 55
10	281 19	281 44	282 10	282 36	283 01	283 27	283 53	284 19	284 47	285 12
14	285 38	286 03	286 28	286 53	287 19	287 44	288 09	288 35	289 01	289 28
18	289 55	290 20	290 44	291 09	291 34	291 59	292 24	292 48	293 13	293 39
22	294 10	294 35	294 58	295 22	295 47	296 10	296 35	296 58	297 23	297 48
26	298 23	298 47	299 10	299 32	299 56	300 19	300 43	301 06	301 29	301 53
♒ 0	302 34	302 56	303 18	303 40	304 03	304 25	304 48	305 10	305 32	305 55
4	306 42	307 03	307 23	307 44	308 06	308 27	308 48	309 10	309 31	309 53
8	310 45	311 06	311 25	311 45	312 05	312 25	312 45	313 05	313 26	313 46
12	314 47	315 06	315 24	315 43	316 01	316 20	316 39	316 58	317 17	317 36
16	318 46	319 03	319 21	319 38	319 55	320 13	320 30	320 48	321 05	321 23
20	322 41	322 57	323 13	323 29	323 45	324 01	324 17	324 33	324 49	325 06
24	326 34	326 49	327 03	327 17	327 33	327 47	328 01	328 17	328 31	328 46
28	330 24	330 37	331 50	331 03	331 16	331 30	331 42	331 56	332 09	332 22
♓ 2	334 12	334 23	334 35	334 46	334 57	335 10	335 21	335 32	335 44	335 56
6	337 57	338 08	338 18	338 27	338 37	338 47	338 57	339 08	339 17	339 28
10	341 41	341 50	341 58	342 06	342 14	342 23	342 31	342 40	342 48	342 57
14	345 23	345 30	345 37	345 53	345 50	345 56	346 03	346 10	346 17	346 24
18	349 03	349 08	349 14	349 19	349 24	349 28	349 34	349 39	349 44	349 49
22	352 43	352 46	352 50	352 53	352 56	353 00	353 03	353 07	353 10	353 13
26	356 22	356 24	356 25	356 27	356 28	356 31	356 32	356 34	356 36	356 37
30	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00

A Table of the Oblique Aſcenſions of the *Ecliptique*, from 0. to 67 degrees of Latitude.

Elevation of the Pole.

		11	12	13	14	15	16	17	18	19	20
S	D	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′
♈	0	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00
	4	003 21	003 20	003 17	003 16	003 14	003 12	003 10	003 08	003 07	003 05
	8	006 43	006 40	006 36	006 33	006 29	006 26	006 22	006 18	006 15	006 11
	12	010 06	010 00	009 56	009 50	009 45	009 40	009 34	009 28	009 23	009 17
	16	013 30	013 22	013 16	013 09	013 01	012 55	012 47	012 40	012 32	012 25
	20	016 55	016 46	016 38	016 29	016 20	016 11	016 02	015 53	015 44	015 35
	24	020 23	020 12	020 02	019 51	019 40	019 30	019 19	019 09	018 58	018 47
	28	023 52	023 40	023 28	023 16	023 04	022 51	022 39	022 27	022 14	022 01
♉	2	027 24	027 11	026 57	026 43	026 29	026 15	026 01	025 47	025 33	025 18
	6	030 59	030 44	030 28	030 13	029 58	029 42	029 27	029 10	028 55	028 39
	10	034 38	034 21	034 04	033 48	033 31	033 13	032 56	032 38	032 21	032 03
	14	038 19	038 01	037 43	037 24	037 06	036 47	036 28	036 09	035 50	035 31
	18	042 05	041 45	041 26	041 06	040 46	040 26	040 05	039 44	039 24	039 03
	22	045 54	045 32	045 12	044 50	044 29	044 08	043 46	043 24	043 02	042 40
	26	049 46	049 23	049 01	048 39	048 17	047 54	047 31	047 07	046 44	046 20
♊	0	053 42	053 19	052 55	052 32	052 09	051 45	051 20	050 56	050 31	050 06
	4	057 43	057 19	056 55	056 30	056 05	055 41	055 15	054 50	054 24	053 58
	8	061 48	061 22	060 58	060 32	060 06	059 40	059 15	058 48	058 21	057 54
	12	065 56	065 30	065 04	064 38	064 12	063 45	063 17	062 50	062 23	061 55
	16	070 07	069 41	069 14	068 48	068 21	067 53	067 25	066 57	066 29	066 01
	20	074 21	073 55	073 28	072 00	072 33	072 05	071 37	071 09	070 40	070 11
	24	078 38	078 11	077 44	077 16	076 49	076 21	075 53	075 24	074 55	074 25
	28	082 58	082 31	082 04	081 36	081 08	080 40	080 12	079 43	079 13	078 44
♋	2	087 20	086 53	086 25	085 57	085 30	085 01	084 33	084 04	083 35	083 05
	6	091 43	091 16	090 49	090 21	089 54	089 25	088 57	088 28	087 59	087 29
	10	096 07	095 41	095 14	094 46	094 19	093 51	093 23	092 55	092 26	091 57
	14	100 31	100 06	099 39	099 12	098 46	098 18	097 50	097 22	096 54	096 25
	18	104 57	104 31	104 05	103 39	103 13	102 46	102 18	101 52	101 24	100 55
	22	109 21	108 55	108 31	108 05	107 40	107 14	106 48	106 21	105 55	105 26
	26	113 44	113 19	112 55	112 31	112 06	111 41	111 16	110 51	110 25	109 58
♌	0	118 06	117 43	117 19	116 56	116 33	116 09	115 44	115 20	114 55	114 30
	4	122 26	122 04	121 42	121 20	120 57	120 35	120 12	119 48	119 25	119 01
	8	126 45	126 23	126 02	125 42	125 20	124 59	124 37	124 15	123 53	123 31
	12	131 01	130 41	130 22	130 02	129 42	123 22	129 02	128 41	128 20	128 00
	16	135 16	134 58	134 40	134 22	134 03	133 44	133 26	133 06	132 47	132 28
	20	139 28	139 11	138 54	138 38	138 21	138 03	137 46	137 28	137 11	136 53
	24	143 39	143 23	143 08	142 53	142 37	142 22	142 06	141 50	141 35	141 18
	28	147 47	147 33	147 19	147 05	146 52	146 38	146 24	146 10	145 55	145 41
♍	2	151 53	151 41	151 29	151 17	151 04	150 52	150 40	150 28	150 15	150 02
	6	155 58	155 48	155 37	155 27	155 16	155 06	154 55	154 44	154 34	154 22
	10	160 01	159 52	159 44	159 35	159 26	159 17	159 08	158 59	158 50	158 41
	14	164 03	163 56	163 49	163 42	163 34	163 28	163 20	163 13	163 06	162 58
	18	168 03	167 58	167 53	167 48	167 42	167 37	167 31	167 25	167 20	167 14
	22	172 03	171 59	171 56	171 52	171 49	171 45	171 41	171 37	171 34	171 30
	26	176 02	176 00	175 58	175 56	175 55	175 53	175 59	175 49	175 48	175 46
	30	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00

A Table of the Oblique Aſcenſions of the *Ecliptique*, from 0. to 67 degrees of Latitude.

Elevation of the Pole.

		11	12	13	14	15	16	17	18	19	20
S	D	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′
♎	0	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00
	4	183 58	184 00	184 02	184 04	184 05	184 07	184 09	184 11	184 12	184 14
	8	187 57	188 01	188 04	188 08	188 11	188 15	188 19	188 23	188 26	188 30
	12	191 57	192 02	192 07	192 12	192 18	192 23	192 29	192 35	192 40	192 46
	16	195 57	196 04	196 11	196 18	196 26	196 32	196 40	196 47	196 54	197 02
	20	199 59	200 08	200 16	200 25	200 34	200 43	200 52	201 01	201 10	201 19
	24	204 02	204 12	204 23	204 33	204 44	204 55	205 05	205 16	205 26	205 38
	28	208 07	208 19	208 31	208 43	208 56	209 08	209 20	209 32	209 45	209 58
♏	2	212 13	212 27	212 41	212 55	213 08	213 22	213 36	213 50	214 05	214 19
	6	216 21	216 37	216 52	217 07	217 23	217 38	217 54	218 10	218 25	218 42
	10	220 32	220 49	221 06	221 22	221 39	221 57	222 14	222 32	222 49	223 07
	14	224 44	225 02	225 20	225 38	225 57	226 16	226 34	226 54	227 13	227 32
	18	228 59	229 19	229 38	229 58	230 18	230 38	230 58	231 19	231 40	232 00
	22	233 15	233 37	233 58	234 18	234 40	235 01	235 23	235 45	236 07	236 29
	26	237 34	237 56	238 18	238 40	239 03	239 26	239 48	240 12	240 35	240 59
♐	0	241 54	242 17	242 41	243 04	243 27	243 51	244 16	244 40	245 05	245 30
	4	246 16	246 41	247 05	247 29	247 54	248 19	248 44	249 09	249 35	250 02
	8	250 39	251 05	251 29	251 55	252 20	252 46	253 12	253 39	254 05	254 34
	12	255 03	255 29	255 55	256 21	256 47	257 14	257 42	258 08	258 36	259 05
	16	259 29	259 54	260 21	260 48	261 14	261 42	262 10	262 38	263 06	263 35
	20	263 53	264 19	264 46	265 14	265 41	266 09	266 37	267 05	267 34	268 03
	24	268 17	268 44	269 11	269 39	270 06	270 35	271 03	271 32	272 01	272 31
	28	272 40	273 07	273 35	274 03	274 30	274 59	275 27	275 56	276 25	276 55
♑	2	277 02	277 29	277 56	278 24	278 52	279 20	279 48	280 17	280 47	281 16
	6	281 22	281 49	282 16	282 44	283 11	283 39	284 07	284 36	285 05	285 35
	10	285 39	286 05	286 32	287 00	287 27	287 55	288 23	288 51	289 20	289 49
	14	289 53	290 19	290 46	291 12	291 39	292 07	292 35	293 03	293 31	293 59
	18	294 04	294 30	294 56	295 22	295 48	296 15	296 43	297 10	297 57	298 05
	22	298 12	298 38	299 02	299 28	299 54	300 20	300 45	301 12	301 39	302 06
	26	302 17	302 41	303 05	303 30	303 55	304 19	304 45	305 10	305 36	306 02
♒	0	306 18	306 41	307 05	307 28	307 51	308 15	308 40	309 04	309 29	309 54
	4	310 14	310 37	310 59	311 21	311 43	312 06	312 29	312 53	313 16	313 40
	8	314 06	314 28	314 48	315 10	315 31	315 55	316 14	316 36	316 58	317 20
	12	317 55	318 15	318 37	318 54	319 14	319 34	319 55	320 16	320 36	320 57
	16	321 41	321 59	322 17	322 36	322 54	323 13	323 32	323 51	324 10	324 29
	20	325 22	325 39	325 56	326 12	326 29	326 47	327 04	327 22	327 39	327 57
	24	329 01	329 16	329 32	329 47	330 02	330 18	330 33	330 50	331 05	331 21
	28	332 36	332 49	333 03	333 17	333 31	333 45	333 58	334 13	334 27	334 42
♓	2	336 08	336 20	336 32	336 44	336 56	337 09	397 21	337 33	337 46	337 59
	6	339 37	339 48	339 58	340 09	340 20	340 30	340 41	340 51	341 02	341 13
	10	343 05	343 14	343 22	343 31	343 40	343 49	343 58	344 07	344 16	344 25
	14	346 30	346 38	346 44	346 51	346 59	347 05	347 13	347 20	347 28	347 35
	18	349 54	350 00	350 04	350 10	350 15	350 20	350 26	350 32	350 37	350 43
	22	353 17	353 20	353 24	353 27	353 31	353 34	353 38	353 42	353 45	353 49
	26	356 39	356 40	356 43	356 44	356 46	356 48	356 50	356 52	356 53	356 50
	30	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00

A Table of the Oblique Aſcenſions of the *Ecliptique*, from 0. to 67 degrees of Latitude.

Elevation of the Pole.

		21	22	23	24	25	26	27	28	29	30
S	D	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′
♈	0	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00
	4	003 03	003 01	002 59	002 57	002 53	002 57	002 51	002 48	002 47	002 44
	8	006 07	006 03	005 59	005 55	005 51	005 47	005 43	005 38	005 35	005 30
	12	009 11	009 06	009 00	008 54	008 48	008 42	008 35	008 29	008 23	008 16
	16	010 17	012 10	012 02	011 54	011 46	011 38	011 30	011 21	011 12	011 04
	20	015 25	015 16	015 06	014 56	014 46	014 36	014 26	014 15	014 04	013 54
	24	018 35	018 24	018 12	018 00	017 49	017 36	017 24	017 11	016 59	016 46
	28	021 48	021 35	021 21	021 08	020 54	020 40	020 25	020 11	019 55	019 41
♉	2	025 03	024 48	024 33	024 18	024 01	023 46	023 29	023 13	022 55	022 39
	6	028 21	028 05	027 48	027 31	027 13	026 55	026 37	026 18	026 00	025 40
	10	031 44	031 26	031 07	031 48	030 29	030 09	029 49	029 29	029 08	028 47
	14	035 10	034 50	034 30	034 09	033 49	033 27	033 04	032 43	032 19	031 57
	18	038 41	038 20	037 57	037 36	037 13	036 50	036 26	036 02	035 37	035 13
	22	042 17	041 54	041 30	041 06	040 42	040 17	039 53	039 27	039 00	038 34
	26	045 56	045 32	045 07	044 41	044 15	043 50	043 22	042 56	042 28	042 00
♊	0	049 41	049 15	048 49	048 22	047 54	047 28	047 00	046 31	046 02	045 32
	4	053 32	053 04	052 38	052 09	051 41	051 12	050 43	050 13	049 43	049 12
	8	057 27	056 58	056 30	056 01	055 32	055 02	054 32	054 00	053 29	052 57
	12	061 27	060 58	060 28	059 59	059 29	058 58	058 26	057 54	057 21	056 49
	16	065 32	065 03	064 32	064 01	063 31	062 59	062 27	061 55	061 20	060 47
	20	069 41	069 11	068 40	068 09	067 38	067 06	066 33	066 00	065 26	064 51
	24	073 55	073 25	072 54	072 22	071 50	071 18	070 45	070 11	069 37	069 02
	28	078 13	077 42	077 12	076 40	076 08	075 35	075 02	074 28	073 53	073 18
♋	2	082 35	082 04	081 34	081 02	080 30	079 57	079 24	078 50	078 15	077 40
	6	086 59	086 29	085 58	085 27	084 55	084 23	083 50	083 16	082 41	082 06
	10	091 27	090 57	090 20	089 55	089 24	088 52	088 19	087 46	087 12	086 37
	14	095 56	095 29	094 57	094 26	093 56	093 24	092 51	092 19	091 45	091 11
	18	100 28	099 59	099 29	098 59	099 29	097 59	097 27	096 55	096 21	095 49
	22	105 00	104 31	104 03	103 34	103 05	102 35	102 05	101 33	101 02	100 29
	26	109 32	109 05	108 38	108 10	107 41	107 12	106 44	106 13	105 43	105 12
♌	0	114 05	113 39	113 13	112 46	112 18	111 52	111 24	110 55	110 26	109 56
	4	118 37	118 12	117 48	117 22	116 56	116 31	116 04	115 37	115 09	114 40
	8	123 08	122 44	122 21	121 57	121 33	121 09	120 43	120 18	119 51	119 24
	12	127 38	127 16	126 54	126 32	126 10	125 47	125 23	124 59	124 34	124 09
	16	132 07	131 48	131 27	131 06	130 46	130 24	130 02	129 40	129 17	128 54
	20	136 34	136 16	135 57	135 38	135 19	134 59	134 39	134 19	133 58	133 37
	24	141 01	140 44	140 28	140 10	139 52	139 45	139 17	138 58	138 39	138 20
	28	145 25	145 11	144 56	144 40	144 24	144 08	143 52	143 39	143 18	143 01
♍	2	149 49	149 35	149 22	149 08	148 55	148 40	148 26	148 11	147 57	147 41
	6	154 11	153 59	153 48	153 36	153 24	153 12	153 00	152 47	152 34	152 21
	10	158 31	158 22	158 12	158 02	157 52	157 42	157 32	157 21	157 10	157 01
	14	162 51	162 43	162 36	166 27	162 20	162 11	162 03	161 54	161 46	161 37
	18	167 09	167 03	166 58	166 51	166 46	166 39	166 33	166 26	166 20	166 13
	22	171 26	171 23	171 19	171 15	171 11	171 07	171 02	170 58	170 54	170 49
	26	175 44	175 42	175 40	175 38	175 36	175 34	175 32	175 29	175 28	175 25
♎	0	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00

A Table of the Oblique Aſcenſions of the *Ecliptique* from o. to 67 degrees of Latitude.

Elevation of the Pole.

S D	21	22	23	24	25	26	27	28	29	30
	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′
♎ 0	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00
4	184 16	184 18	184 20	184 21	184 24	184 26	184 28	184 31	184 32	184 35
8	188 34	188 37	188 41	188 45	188 49	188 53	188 58	189 02	189 06	189 11
12	192 51	192 57	193 02	193 09	193 14	193 21	193 27	193 34	193 40	193 47
16	197 09	197 17	197 24	197 33	197 40	197 49	197 57	198 06	198 14	198 23
20	201 29	201 38	201 48	201 58	202 08	202 18	202 28	202 38	202 50	202 59
24	205 49	206 01	206 12	206 24	206 36	206 48	207 00	207 13	207 26	207 39
28	210 11	210 25	210 38	210 52	211 05	211 20	211 34	211 49	212 03	212 19
♏ 2	214 35	214 49	215 04	215 20	215 36	215 52	216 08	216 25	216 42	216 59
6	218 59	219 16	219 32	219 50	220 08	220 25	220 43	221 02	221 21	221 40
10	223 26	223 44	224 03	224 22	324 41	225 01	225 21	225 41	226 02	226 23
14	227 53	228 12	228 33	228 54	229 14	229 36	229 58	230 20	230 43	231 06
18	232 22	232 44	233 06	233 08	233 50	234 13	234 37	235 01	235 26	235 51
22	236 52	237 16	237 39	238 03	238 27	238 51	239 17	239 42	240 09	240 36
26	241 23	241 48	242 12	242 38	243 04	243 29	243 56	244 23	244 51	245 20
♐ 0	245 55	246 21	246 47	247 14	247 42	248 08	248 36	249 05	249 34	250 04
4	250 28	250 55	251 22	251 50	252 19	252 48	253 16	253 47	254 17	254 48
8	255 00	255 29	255 57	256 26	256 55	257 15	257 55	258 27	258 58	259 31
12	259 32	260 01	260 31	261 01	261 31	262 01	262 33	263 05	263 38	264 11
16	264 04	264 33	265 03	265 34	266 04	266 36	267 09	267 41	268 15	268 49
20	268 33	269 03	269 34	270 05	270 36	271 08	271 41	272 14	272 48	273 23
24	273 01	273 31	274 02	274 33	274 05	275 37	276 10	276 44	277 19	277 54
28	277 25	277 50	278 26	278 58	279 30	280 03	280 36	281 10	281 45	282 20
♑ 2	281 47	282 18	282 48	283 20	283 52	284 25	284 58	285 32	286 07	286 42
6	286 05	286 35	287 06	287 38	288 10	288 42	289 15	289 49	290 23	290 58
10	290 19	290 49	291 20	291 51	292 22	292 54	293 27	294 00	294 34	295 09
14	294 28	294 57	295 28	295 59	296 29	297 01	297 33	298 05	298 40	299 13
18	298 33	299 02	299 32	300 01	300 31	301 02	301 34	302 06	302 39	303 11
22	302 33	303 02	303 30	303 59	304 28	304 59	305 28	306 00	306 31	307 03
26	306 28	306 56	307 22	307 51	308 19	308 48	309 17	309 47	310 17	310 48
♒ 0	310 19	310 45	311 11	311 38	312 06	312 32	313 00	313 29	313 58	314 28
4	314 04	314 28	314 53	315 19	315 45	316 10	316 38	317 04	317 32	318 00
8	317 43	318 06	318 30	318 54	319 18	319 43	320 07	320 33	321 00	321 26
12	321 19	321 40	322 03	322 24	322 47	323 10	323 34	323 58	324 23	324 47
16	324 50	325 10	325 30	325 51	326 11	326 33	326 56	327 17	327 41	328 03
20	328 16	328 34	328 53	329 12	329 31	329 51	330 11	330 31	330 52	331 13
24	331 39	331 55	332 12	332 29	332 47	333 05	333 23	333 42	334 00	334 20
28	334 57	335 12	335 29	335 42	335 59	336 14	336 31	336 47	337 05	337 21
♓ 2	338 12	338 25	338 39	338 52	339 06	339 20	339 35	339 49	340 05	340 19
6	341 25	341 36	341 48	342 00	342 11	342 24	342 36	342 49	343 01	343 14
10	344 35	344 44	344 54	345 04	345 14	345 24	345 34	345 45	345 56	346 06
14	347 43	347 50	347 58	348 06	348 14	348 22	348 30	348 39	348 48	348 56
18	350 49	350 54	351 00	351 06	351 12	351 18	351 25	351 31	351 37	351 44
22	353 53	353 57	354 01	354 05	354 09	354 13	354 17	354 22	354 25	354 30
26	356 57	356 59	357 01	357 03	357 05	357 07	357 09	357 12	357 13	357 16
30	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00

A Table of the Oblique Aſcenſions of the *Ecliptique*, from 0. to 67 degrees of Latitude.

Elevation of the Pole.

S	D	31	32	33	34	35	36	37	38	39	40
		D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′
♈	0	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00
	4	002 42	002 40	002 37	002 35	002 32	002 30	002 28	002 25	002 22	002 20
	8	005 26	005 21	005 16	005 11	005 06	005 02	004 56	004 51	004 46	004 40
	12	008 10	008 03	007 56	007 48	007 41	007 34	007 26	007 18	007 10	007 01
	16	010 55	010 46	010 36	010 27	010 17	010 07	009 57	009 46	009 35	009 24
	20	013 42	013 31	013 19	013 07	012 55	012 43	012 30	012 17	012 03	011 48
	24	016 32	016 19	016 04	015 51	015 35	015 21	015 06	014 49	014 34	014 16
	28	019 25	019 10	018 52	018 37	018 19	018 02	017 45	017 25	017 07	016 48
♉	2	022 21	022 04	021 44	021 26	021 07	020 46	020 27	020 05	019 44	019 22
	6	025 20	025 01	024 40	024 19	023 57	023 35	023 12	022 49	022 25	022 00
	10	028 25	028 03	027 40	027 17	026 53	026 29	026 03	025 38	025 11	024 44
	14	031 33	031 09	030 44	030 19	029 53	029 26	028 58	028 31	028 02	027 32
	18	034 47	034 21	033 54	033 27	032 59	032 30	032 00	031 30	030 58	030 26
	22	038 06	037 39	037 10	036 41	036 10	035 40	035 08	034 35	034 02	033 27
	26	041 31	041 02	040 31	040 00	039 52	038 56	038 21	037 46	037 11	036 34
♊	0	045 02	044 31	043 59	043 26	042 52	042 18	041 42	041 06	040 28	039 49
	4	048 40	048 07	047 33	047 00	046 24	045 48	045 11	044 32	043 54	043 12
	8	052 24	051 50	051 15	050 40	050 03	049 25	048 47	048 06	047 26	046 43
	12	056 14	055 38	055 03	054 26	053 49	053 09	052 30	051 49	051 06	050 23
	16	060 12	059 36	058 59	058 21	057 42	057 03	056 22	055 39	054 56	054 11
	20	064 15	063 39	063 01	062 23	061 43	061 03	060 21	059 38	058 53	058 07
	24	068 25	067 48	067 10	066 31	065 51	065 10	064 28	063 44	062 59	062 12
	28	072 41	072 04	071 26	070 47	070 05	069 24	068 42	067 58	067 13	066 26
♋	2	077 02	076 25	075 48	075 09	074 28	073 47	073 04	072 20	071 35	070 47
	6	081 29	080 53	080 15	079 36	078 56	078 15	077 33	076 49	076 04	075 17
	10	086 01	085 25	084 47	084 09	083 29	082 49	082 07	081 24	080 39	079 53
	14	090 37	090 01	089 23	088 46	088 07	087 28	086 46	086 04	085 21	084 35
	18	095 16	094 40	094 04	093 28	092 50	092 11	091 31	090 50	090 08	089 29
	22	099 57	099 23	098 48	098 13	097 36	046 58	096 19	095 40	094 59	094 17
	26	104 40	104 07	103 34	103 00	102 24	101 49	101 11	100 33	099 54	099 13
♌	0	109 26	108 55	108 23	107 50	107 16	106 42	106 06	105 30	104 52	104 13
	4	114 11	113 42	113 11	112 40	112 08	111 36	111 52	110 27	109 52	109 15
	8	118 57	118 29	118 01	117 31	117 01	116 30	115 59	115 26	114 53	114 18
	12	123 43	123 17	122 51	122 23	121 55	121 26	120 57	120 27	119 55	119 22
	16	128 31	128 06	127 42	127 16	126 51	126 23	125 56	125 28	124 59	124 28
	20	133 15	132 53	132 30	132 07	131 43	131 19	130 53	130 28	130 01	129 34
	24	138 00	137 41	137 19	136 59	136 37	136 15	135 52	135 28	135 05	134 40
	28	142 44	142 26	142 07	141 49	141 29	141 09	140 49	140 28	140 07	139 44
♍	2	147 26	147 10	146 54	146 38	146 21	146 03	145 45	145 27	145 08	144 48
	6	152 08	151 54	151 40	151 26	151 11	150 57	150 41	150 25	150 09	149 52
	10	156 48	156 37	156 25	156 13	156 01	155 49	155 36	155 23	155 09	154 54
	14	161 28	161 19	161 09	161 00	160 50	160 41	160 30	160 19	160 09	159 57
	18	166 07	166 00	165 53	165 46	165 38	165 31	165 23	165 15	165 07	164 59
	22	170 48	170 40	170 36	170 31	170 26	170 21	170 16	170 10	170 05	170 00
	26	175 23	175 20	175 18	175 16	175 13	175 11	175 08	175 06	175 03	175 00
	30	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00

A Table of the Oblique Aſcenſions of the *Ecliptique* from 0. to 67 degrees of Latitude.

Elevation of the Pole.

		31	32	33	34	35	36	37	38	39	40
S	D	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′
♎	0	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00
	4	184 37	184 40	184 42	184 44	184 47	184 49	184 52	184 54	184 57	185 00
	8	189 15	189 20	189 24	189 29	189 34	189 39	189 44	189 50	189 55	190 00
	12	193 53	194 00	194 07	194 14	194 22	194 29	194 37	194 45	194 53	195 01
	16	198 32	198 41	198 51	199 00	199 10	199 19	199 30	199 41	199 51	200 03
	20	203 12	203 23	203 35	203 47	203 59	204 11	204 24	204 37	204 51	205 05
	24	207 52	208 06	208 20	208 34	208 49	209 03	209 19	209 35	209 51	210 08
	28	212 34	212 50	213 06	213 22	213 39	213 57	214 15	214 33	214 52	215 12
♏	2	217 16	217 34	217 53	218 11	218 31	218 51	219 11	219 32	219 53	220 19
	6	222 00	222 19	222 41	223 01	223 23	223 45	224 08	224 32	224 55	225 23
	10	226 45	227 07	227 30	227 53	228 17	228 41	229 07	229 32	229 59	230 26
	14	231 29	231 54	232 18	232 44	233 09	233 37	234 04	234 32	235 01	235 32
	18	236 17	236 43	237 09	237 37	238 05	238 34	239 03	239 33	240 05	240 38
	22	241 03	241 31	241 59	242 29	242 59	243 30	244 01	244 34	245 07	245 42
	26	245 49	246 18	246 49	247 20	247 52	248 24	248 58	249 33	250 08	250 45
♐	0	250 34	251 05	251 37	252 10	252 44	253 18	253 54	254 30	255 08	255 47
	4	255 20	255 53	256 26	257 00	257 36	258 11	258 49	259 26	260 06	260 47
	8	260 03	260 37	261 12	261 47	262 24	263 02	263 41	264 20	265 01	265 43
	12	264 44	265 20	265 55	266 32	267 10	267 49	968 29	269 10	269 52	270 36
	16	269 23	269 59	270 37	271 14	271 53	272 32	273 14	273 56	274 39	275 25
	20	273 59	274 35	275 13	275 51	276 31	277 11	277 53	278 36	279 21	280 07
	24	278 31	279 07	279 45	280 24	281 04	281 45	282 27	283 11	283 56	284 43
	28	282 58	283 35	284 12	284 51	285 32	286 13	286 56	287 40	288 25	289 13
♑	2	287 19	287 56	288 34	289 13	289 55	290 36	291 18	292 02	292 47	293 34
	6	291 35	292 12	292 50	293 29	294 09	294 50	295 32	296 16	297 01	297 48
	10	295 45	296 21	296 59	297 37	298 17	298 57	299 39	300 22	301 07	301 53
	14	299 48	300 24	301 01	301 39	302 18	302 57	303 38	304 21	305 04	305 49
	18	303 46	304 22	304 57	305 34	306 11	306 51	307 30	308 11	308 54	309 37
	22	307 36	308 10	308 45	309 20	309 57	310 35	311 13	311 54	312 34	313 17
	26	311 20	311 53	312 27	313 00	313 36	314 12	314 49	315 28	316 06	316 48
♒	0	314 58	315 29	316 01	316 34	317 08	317 42	318 18	318 54	319 32	320 11
	4	318 29	318 58	319 29	320 00	320 32	321 04	321 39	322 13	322 49	323 26
	8	321 54	322 21	322 50	323 19	323 50	324 20	324 52	325 25	325 58	326 33
	12	325 13	325 39	326 06	326 33	327 01	327 30	328 00	328 30	329 02	329 34
	16	328 27	328 51	329 16	329 41	330 07	330 34	331 02	331 29	331 58	332 28
	20	331 35	331 57	332 20	332 43	333 07	333 31	333 57	334 22	334 49	335 16
	24	334 40	334 59	335 20	335 41	336 03	336 25	336 48	337 11	337 35	338 00
	28	337 39	337 56	338 16	338 34	338 53	339 14	339 33	339 55	340 16	340 38
♓	2	340 35	340 50	341 08	341 23	341 41	341 58	342 15	342 35	342 53	343 12
	6	343 28	343 41	343 56	344 09	344 25	344 39	344 54	345 11	345 26	345 44
	10	346 18	346 29	346 41	346 53	347 05	347 17	347 30	347 43	347 57	348 12
	14	349 05	349 14	349 24	349 33	349 43	349 53	350 03	350 14	350 25	350 36
	18	351 50	351 57	352 04	352 12	352 19	352 26	352 34	352 42	352 50	352 59
	22	354 34	354 39	354 44	354 49	354 54	354 58	355 04	355 09	355 14	355 2
	26	357 18	357 20	357 23	357 25	357 28	357 30	357 52	357 35	357 38	357 4
	30	360 00	360 00	360 00	360 00	360 60	360 00	360 00	360 00	360 00	360 00

A Table of the Oblique Aſcenſions of the *Ecliptique*, from 0. to 67 degrees of Latitude.

Elevation of the Pole.

	41	42	43	44	45	46	47	48	49	50
S D	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′
♈ 0	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00
4	002 16	002 13	002 11	002 08	002 04	002 00	001 55	001 53	001 50	001 46
8	004 34	004 28	004 22	004 16	004 09	004 02	003 55	003 48	003 40	003 32
12	006 53	006 44	006 34	0 6 25	006 15	006 05	005 55	005 44	005 32	005 20
16	009 13	009 00	008 48	008 36	008 23	0 8 09	007 55	007 40	007 25	007 09
20	011 35	011 20	011 04	010 49	010 32	010 15	009 58	009 39	009 20	009 00
24	013 59	013 42	013 24	013 05	012 14	012 24	012 03	011 41	011 18	010 55
28	016 28	016 07	015 46	015 24	015 01	014 37	014 12	013 46	013 20	012 52
♉ 2	018 59	018 36	018 12	017 46	017 20	016 53	016 25	015 56	015 25	014 53
6	021 34	021 08	020 41	020 12	019 43	019 13	018 41	018 09	017 34	016 58
10	024 15	023 46	023 16	022 45	022 12	021 39	021 04	020 21	019 49	019 09
14	027 01	026 29	025 56	025 22	024 47	024 10	023 31	022 51	022 10	021 26
18	029 53	029 18	028 44	028 06	027 28	026 47	026 05	025 23	024 28	023 49
22	032 52	032 15	031 37	030 57	030 15	029 33	028 48	028 02	027 13	026 21
26	035 56	035 16	034 35	033 53	033 10	032 23	031 46	030 46	029 53	028 59
♊ 0	039 09	038 27	037 44	036 59	036 13	035 24	034 34	033 41	032 45	031 47
4	042 30	041 46	041 02	040 14	039 25	038 34	037 41	036 45	035 47	034 46
8	046 00	045 13	044 27	043 38	042 47	041 52	040 58	040 01	038 49	037 55
12	049 38	048 51	048 02	047 11	046 18	045 24	044 25	043 24	042 22	041 14
16	053 25	052 36	051 46	050 53	049 59	049 03	048 03	047 01	045 56	044 47
20	057 20	056 30	055 39	054 46	053 50	052 53	051 52	050 24	049 42	048 32
24	061 24	060 34	059 43	058 48	057 52	056 53	055 52	054 48	053 40	052 29
28	065 38	064 42	063 55	063 01	062 04	061 04	060 03	058 58	057 50	056 38
♋ 2	069 59	069 02	068 17	067 21	066 26	065 27	064 25	063 20	062 11	061 00
6	074 29	073 39	072 47	071 53	070 56	069 58	068 57	067 52	066 44	065 33
10	079 06	078 16	077 25	076 32	075 36	074 39	073 38	072 34	071 28	070 18
14	083 49	083 01	082 11	081 18	080 24	079 28	078 28	077 26	076 20	075 12
18	088 39	087 52	087 04	086 12	085 20	084 25	083 26	082 26	081 24	080 16
22	93 33	092 47	092 01	091 11	090 20	089 27	088 31	087 34	086 32	085 21
26	098 31	097 47	097 02	096 15	095 26	094 35	093 42	092 46	091 48	090 47
♌ 0	103 33	102 51	102 08	101 23	100 37	099 48	098 58	098 05	097 09	096 11
4	108 37	107 57	107 16	106 34	105 50	105 04	104 17	103 27	102 34	101 40
8	113 42	113 05	112 27	111 47	111 06	110 23	109 38	108 52	108 03	107 12
12	118 49	118 15	117 39	117 02	116 23	115 44	115 02	114 19	113 34	112 46
16	123 57	123 25	122 53	122 19	121 42	121 06	120 28	119 48	119 07	118 23
20	129 05	128 36	128 06	127 35	127 02	126 29	125 54	125 17	124 39	123 59
24	134 14	133 48	133 21	132 52	132 23	131 52	131 20	130 49	130 13	129 37
28	139 22	138 58	138 34	138 08	147 43	137 15	136 47	136 18	135 48	135 15
♍ 2	144 29	144 08	143 47	143 24	143 02	142 38	142 13	141 47	141 21	140 53
6	149 35	149 18	148 59	148 40	148 20	148 00	147 39	147 17	146 54	146 30
10	154 41	154 26	154 10	153 55	153 38	153 21	153 04	152 45	152 26	152 06
14	159 46	159 34	159 22	159 09	158 56	158 42	158 28	158 13	157 58	157 42
18	164 50	164 41	164 31	164 22	164 12	164 02	163 52	163 41	163 29	163 17
22	169 53	169 48	169 41	169 35	169 28	169 22	169 15	169 08	169 00	168 52
26	174 57	174 54	174 51	174 48	174 44	174 41	174 38	174 34	174 31	174 27
30	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00

A Table of the Oblique Aſcenſions of the *Ecliptique*, from 0. to 67 degrees of Latitude.

Elevation of the Pole.

S	D	41	42	43	44	45	46	47	48	49	50
S	D	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′
♎	0	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00
	4	185 03	185 06	185 09	185 12	185 16	185 19	185 22	185 26	185 29	185 33
	8	190 07	190 12	190 19	190 25	190 32	190 38	190 45	190 52	191 00	191 08
	12	195 10	195 19	195 29	195 38	195 48	195 58	196 08	196 19	196 31	196 31
	16	200 14	200 26	200 38	200 51	201 04	201 18	201 32	201 47	202 02	202 18
	20	205 19	205 34	205 50	206 05	206 22	206 39	206 56	207 15	207 34	207 54
	24	210 25	210 42	211 01	211 20	211 40	212 00	212 21	212 43	213 06	213 30
	28	215 31	215 52	216 13	216 36	216 58	217 22	217 47	218 13	218 39	219 07
♏	2	220 38	221 02	221 26	221 52	222 17	222 45	223 13	223 42	224 12	224 44
	6	225 46	226 12	226 39	227 08	227 37	228 08	228 40	229 11	229 47	230 23
	10	230 55	231 24	231 54	232 25	232 58	233 31	234 06	234 43	235 21	236 01
	14	236 03	236 35	237 07	237 41	238 18	238 54	239 32	240 12	240 53	241 37
	18	241 11	241 45	242 21	242 58	243 37	244 16	244 58	245 41	246 26	247 14
	22	246 18	246 55	247 33	248 13	248 54	249 37	250 22	251 08	251 57	252 48
	26	251 23	252 03	252 44	253 26	254 10	254 56	255 43	256 33	257 26	258 20
♐	0	256 27	257 09	257 52	258 37	259 23	160 12	261 02	261 55	262 51	263 49
	4	261 29	262 13	262 58	263 45	264 34	265 25	266 18	267 14	268 12	269 13
	8	266 27	267 13	267 59	268 49	269 40	270 33	271 29	272 26	273 28	274 33
	12	271 21	272 08	272 56	273 48	274 40	275 35	276 34	277 34	278 36	279 44
	16	276 11	276 59	277 49	278 42	279 36	280 32	281 32	282 34	283 40	284 48
	20	280 54	281 44	282 35	283 28	284 24	285 21	286 22	287 26	288 32	289 42
	24	285 31	286 21	287 13	288 07	289 04	290 02	291 03	292 08	293 16	294 27
	28	290 01	290 51	291 43	292 39	293 34	294 33	295 35	296 40	297 49	299 00
♑	2	294 22	295 12	296 05	296 59	297 56	298 56	299 57	301 02	302 10	303 22
	6	298 36	299 26	300 17	301 12	302 08	303 07	304 08	305 12	306 20	307 31
	10	302 40	303 30	304 21	305 14	306 10	307 07	308 08	309 12	310 18	311 28
	14	306 35	307 24	308 14	309 07	310 01	310 57	311 57	312 59	314 04	315 13
	18	310 22	311 09	311 58	312 49	313 42	314 36	315 35	316 36	317 38	318 46
	22	314 00	314 47	315 33	316 22	317 13	318 07	319 02	319 59	321 01	322 05
	26	317 30	318 14	318 58	319 46	320 35	321 26	322 19	323 15	324 13	325 14
♒	0	320 51	321 33	322 16	323 01	323 47	324 36	325 26	326 19	327 15	328 13
	4	324 04	324 44	325 25	326 07	326 50	327 37	328 24	329 14	330 07	331 01
	8	327 08	327 55	328 23	329 03	329 45	330 27	331 12	331 58	332 47	333 39
	12	330 07	330 42	331 16	331 54	332 32	333 13	333 55	334 37	335 22	336 11
	16	332 59	333 31	334 04	334 38	335 13	335 50	336 29	337 09	337 50	338 34
	20	335 45	336 14	336 44	337 15	337 48	338 21	338 56	339 33	340 11	340 51
	24	338 26	338 51	339 19	339 48	340 17	340 47	341 19	341 51	342 26	343 02
	28	341 01	341 23	341 48	342 14	342 40	343 07	343 35	344 04	344 35	345 07
♓	2	343 32	343 53	344 14	344 36	344 59	345 23	345 48	346 14	346 40	347 08
	6	346 01	346 18	346 36	346 55	347 16	347 36	347 57	348 19	348 42	349 05
	10	348 25	348 40	348 56	349 11	349 28	349 45	350 02	350 21	350 40	351 00
	14	350 47	351 00	351 12	351 24	351 37	351 51	352 05	352 20	352 35	352 51
	18	353 07	353 16	353 26	353 35	353 45	353 55	354 05	354 16	354 28	354 40
	22	355 26	355 32	355 38	355 44	355 51	355 58	356 05	356 12	356 20	356 28
	26	357 44	357 47	357 49	357 42	357 56	358 00	358 03	358 07	358 10	358 14
	30	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00

A Table of the Oblique Aſcenſions of the *Ecliptique*, from 0. to 67 degrees of Latitude.

Elevation of the Pole

		51	52	53	54	55	56	57	58	59	60
S	D	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′
♈	0	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00	000 00
	4	001 41	001 37	001 32	001 28	001 23	001 18	001 12	001 07	001 00	000 54
	8	003 24	003 15	003 06	002 57	002 47	002 37	002 26	002 14	002 02	001 49
	12	005 08	004 55	004 41	004 27	004 12	003 57	003 40	003 22	003 04	002 45
	16	006 52	006 35	006 17	005 58	005 39	005 17	004 56	004 32	004 07	003 41
	20	008 40	008 18	007 55	007 32	007 07	006 41	006 13	005 43	005 12	004 39
	24	010 30	010 04	009 36	009 08	008 38	008 06	007 33	006 57	006 20	005 39
	28	012 23	011 53	011 20	010 47	010 13	009 35	008 56	008 14	007 30	006 43
♉	2	014 20	013 45	013 08	012 20	011 50	011 07	010 22	009 38	008 44	007 50
	6	016 21	015 42	015 01	014 18	013 32	012 44	011 52	010 59	010 01	008 59
	10	018 28	017 45	016 59	016 11	015 20	014 26	013 29	012 28	011 24	010 15
	14	020 40	019 52	019 02	018 08	017 13	016 13	015 11	014 03	012 51	011 35
	18	023 01	022 08	021 13	020 15	019 14	018 09	017 00	015 45	014 27	013 01
	22	025 28	024 31	023 31	022 28	021 22	020 12	018 56	017 35	016 09	014 36
	26	028 01	027 02	025 58	024 50	023 39	022 22	021 01	019 33	018 00	016 19
♊	0	030 46	029 42	028 34	027 22	026 06	024 44	023 17	021 43	020 02	018 12
	4	033 42	032 34	031 22	030 06	028 44	027 19	025 45	024 05	022 16	020 18
	8	036 48	035 36	034 22	033 01	031 35	030 05	028 27	026 40	024 46	022 40
	12	040 05	038 51	037 32	036 08	034 41	033 03	031 21	029 30	027 28	025 16
	16	043 35	042 19	040 57	039 31	037 59	036 20	034 33	032 36	030 30	028 10
	20	047 18	045 59	044 36	043 07	041 33	039 51	038 00	036 01	033 50	031 25
	24	051 13	049 53	048 29	046 58	045 23	043 38	041 46	039 43	037 30	035 01
	28	055 22	054 02	052 35	051 05	049 28	047 44	045 51	043 45	041 31	039 00
♋	2	059 44	058 24	056 59	055 28	053 49	052 05	050 12	048 07	045 52	043 22
	6	064 18	062 58	061 33	060 03	058 27	056 43	054 50	052 48	050 34	048 06
	10	069 04	067 45	066 22	064 53	063 19	061 37	059 46	057 47	055 36	053 11
	14	073 59	072 44	071 22	069 56	068 24	066 44	064 57	063 01	060 54	058 35
	18	079 08	077 52	076 34	075 10	073 41	072 05	070 23	068 31	066 30	064 17
	22	084 21	083 10	081 55	080 35	079 08	077 37	075 59	074 14	072 19	070 12
	26	089 42	088 34	087 22	086 06	084 45	083 19	081 46	080 06	078 18	076 20
♌	0	095 10	094 06	092 58	091 46	090 30	089 08	087 41	086 07	084 26	082 36
	4	100 42	099 42	098 38	097 31	096 20	095 04	093 42	092 14	090 41	088 59
	8	106 18	105 22	104 22	103 19	102 14	101 03	099 47	098 26	097 00	095 37
	12	111 57	111 04	110 09	109 11	1 8 10	107 05	105 56	104 42	103 23	101 58
	16	117 37	116 49	115 59	115 05	114 10	113 10	112 07	111 00	109 48	108 31
	20	123 18	122 35	121 49	121 01	120 10	119 16	118 19	117 18	116 14	115 05
	24	129 01	128 22	127 41	126 57	126 12	125 24	124 31	123 38	222 41	121 39
	28	134 43	134 08	133 31	132 53	132 13	131 30	130 45	129 57	129 6	128 12
♍	2	140 24	139 54	139 22	138 48	138 13	137 36	136 57	136 15	135 31	134 44
	6	146 06	145 40	145 12	144 43	144 13	143 42	143 08	142 33	141 55	141 15
	10	151 46	151 24	151 01	150 38	150 13	149 47	149 19	148 49	148 18	147 45
	14	157 26	157 08	156 50	156 31	156 11	155 51	155 29	155 05	154 40	154 14
	18	163 05	162 52	162 38	162 24	162 10	161 54	161 37	161 20	161 01	160 42
	22	168 44	168 35	168 26	168 16	168 07	107 57	167 45	167 34	167 21	167 09
	26	174 22	174 18	174 13	174 08	174 04	173 59	173 53	173 48	173 41	173 35
	30	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00

A Table of the Oblique Aſcenſions of the *Ecliptique*, from 0. to 67 degrees of Latitude.

Elevation of the Pole.

S	D	51	52	53	54	55	56	57	58	59	60
		D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′	D ′
♎	0	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00	180 00
	4	185 38	185 42	185 47	185 52	185 56	186 01	186 07	186 12	186 19	186 25
	8	191 16	191 25	191 34	191 44	191 53	192 03	192 15	192 26	192 39	192 51
	12	196 55	197 08	197 22	197 36	197 50	198 06	198 23	198 40	198 59	199 18
	16	202 34	202 52	203 10	203 29	203 49	204 09	204 31	204 55	205 20	205 46
	20	208 14	208 36	208 59	209 22	209 47	210 13	210 41	211 11	211 42	212 15
	24	213 54	214 20	214 48	215 17	215 47	216 18	216 52	217 27	218 05	218 45
	28	219 36	220 06	220 38	221 12	221 47	222 24	223 03	223 45	224 29	225 16
♏	2	225 17	225 52	226 29	227 07	227 47	228 30	229 15	230 03	230 54	231 48
	6	230 59	231 38	232 19	233 33	233 48	234 36	235 29	236 22	237 19	238 21
	10	236 42	237 25	238 11	238 59	239 50	240 44	241 41	242 42	243 46	244 55
	14	242 23	243 11	244 01	244 55	245 50	246 50	247 53	249 00	250 12	251 29
	18	248 03	248 56	249 51	250 49	251 50	252 55	254 04	255 18	256 37	258 02
	22	253 42	254 38	255 38	256 41	257 47	258 57	260 13	261 34	263 00	264 33
	26	259 18	260 18	261 22	260 29	263 40	264 56	266 18	267 46	269 19	271 01
♐	0	264 50	265 54	267 02	268 14	269 30	270 52	272 19	273 53	275 34	277 24
	4	270 18	271 26	272 38	273 54	275 15	276 41	278 14	279 54	281 42	283 40
	8	275 39	276 50	278 05	279 25	280 52	282 23	284 01	285 46	287 41	289 48
	12	280 52	282 08	283 26	284 50	286 19	287 55	289 37	291 29	293 30	295 43
	16	286 01	287 16	288 38	290 04	291 36	293 16	295 03	296 59	299 06	301 25
	20	290 56	292 15	293 38	295 07	296 41	298 22	300 14	302 13	304 24	306 49
	24	295 42	297 02	298 27	299 57	301 33	303 17	305 10	307 12	309 26	311 54
	28	300 16	301 36	303 01	304 32	306 11	307 55	309 48	311 53	314 08	316 38
♑	2	304 38	305 58	307 25	308 55	310 32	312 16	314 09	316 15	318 29	321 0[illegible]
	6	308 47	310 07	311 31	313 02	314 37	316 21	318 14	320 17	322 30	324 59
	10	312 42	314 01	215 24	316 53	318 27	320 09	322 00	323 59	326 10	328 35
	14	316 25	317 41	319 03	320 29	322 01	323 40	325 27	327 24	329 30	331 5[illegible]
	18	319 55	321 09	322 28	323 52	325 19	326 57	328 39	330 30	332 32	334 44
	22	323 12	324 24	325 38	326 59	328 25	329 55	331 33	333 20	335 14	337 20
	26	326 18	327 26	328 38	329 54	331 16	332 42	334 15	335 55	337 44	339 42
♒	0	329 14	330 18	331 26	332 38	333 54	335 16	336 43	338 17	339 58	341 48
	4	331 59	332 58	334 02	335 10	336 21	337 51	338 59	340 27	342 00	343 41
	8	334 32	335 29	336 29	337 32	338 38	339 48	341 04	342 25	343 51	345 24
	12	336 59	337 52	338 47	339 45	340 46	341 38	343 00	344 15	345 33	346 59
	16	339 20	340 08	340 58	341 52	342 47	343 47	344 49	345 57	347 09	348 25
	20	341 32	342 15	343 01	343 49	344 40	345 34	346 31	347 32	348 36	349 45
	24	343 39	344 18	344 59	345 42	346 28	347 16	348 08	349 01	348 59	351 01
	28	345 40	346 15	346 52	347 30	348 10	348 53	349 38	350 26	351 16	352 10
♓	2	347 37	348 07	348 40	349 13	349 47	350 25	351 04	351 46	352 30	353 17
	6	349 30	349 56	350 24	350 52	351 22	351 54	352 27	353 03	353 40	354 21
	10	351 20	351 42	352 05	352 28	352 53	353 19	353 47	354 17	354 48	355 21
	14	353 08	353 25	353 43	354 02	354 21	354 43	355 04	355 28	355 53	356 19
	18	354 52	355 05	355 19	355 33	355 48	356 03	356 20	356 38	356 56	357 15
	22	356 36	356 45	356 54	357 03	357 13	357 23	357 34	357 46	357 58	358 11
	26	358 19	358 23	358 28	358 32	358 37	358 42	358 48	358 53	359 00	359 06
	30	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00	360 00

A Table of the Oblique Aſcenſions of the *Ecliptique*, from 0. to 67 degrees of Latitude.

Elevation of the Pole.

		61		62		63		64		65		66		67	
S	D	D	′	D	′	D	′	D	′	D	′	D	′	D	′
♈	0	000	00	000	00	000	00	000	00	000	00	000	00	000	00
	4	000	46	000	39	000	32	000	23	000	15	000	04	359	55
	8	001	35	001	21	001	05	000	47	000	30	000	10	359	49
	12	002	24	002	02	001	38	001	12	000	45	000	15	359	45
	16	003	12	002	43	002	10	001	37	001	01	000	20	359	40
	20	004	04	003	26	002	46	002	03	001	17	000	27	359	34
	24	004	57	004	11	003	22	002	31	001	34	000	32	359	28
	28	005	53	004	59	004	02	003	00	001	52	000	39	359	21
♉	2	006	51	005	48	004	42	003	30	002	11	000	46	359	14
	6	007	54	006	42	005	25	004	02	002	31	000	53	359	04
	10	009	00	007	40	006	12	004	38	002	54	001	01	358	54
	14	010	10	008	41	007	04	005	16	003	19	001	09	358	43
	18	011	29	009	49	008	01	006	01	003	47	001	20	358	30
	22	012	54	011	04	009	04	006	49	004	19	001	31	358	16
	26	014	29	012	27	010	14	007	45	004	57	001	46	358	00
♊	0	016	13	014	00	011	33	008	47	005	41	002	02	357	40
	4	018	08	015	46	013	04	010	03	006	34	002	20	357	15
	8	020	20	017	45	014	50	011	31	007	37	002	42	356	18
	12	022	48	020	02	016	54	013	15	008	54	003	08	353	18
	16	025	34	022	39	019	18	015	22	010	34	003	08	348	57
	20	028	44	025	40	022	10	018	00	012	44	004	12	000	00
	24	032	13	029	02	025	26	021	00	015	18	004	49	000	00
	28	036	09	032	56	029	13	024	42	018	49	006	49	000	00
♋	2	040	33	037	21	033	37	029	04	023	11	011	10	000	00
	6	045	18	042	10	038	31	034	06	028	26	017	46	000	00
	10	050	28	047	28	043	57	039	43	034	27	026	01	000	0
	14	055	59	053	05	049	45	045	49	040	59	034	12	019	23
	18	061	50	059	05	055	56	052	17	047	58	042	19	032	20
	22	067	57	065	21	062	24	059	04	055	11	050	23	043	52
	26	074	10	071	45	069	05	066	02	062	32	058	25	053	17
♌	0	080	37	078	22	075	56	073	12	070	01	066	25	062	02
	4	087	09	085	07	082	54	080	25	077	37	074	25	070	41
	8	093	46	091	55	089	54	087	41	085	13	082	21	079	08
	12	100	26	098	47	096	58	094	57	092	46	090	15	087	30
	16	107	08	105	38	104	01	102	13	100	17	098	05	095	41
	20	113	50	112	30	111	03	109	29	107	45	105	51	103	46
	24	120	33	119	22	118	06	116	42	115	11	113	33	111	44
	28	127	14	126	11	125	06	123	52	122	34	121	08	119	39
♍	2	133	53	132	59	132	02	131	00	129	54	128	40	127	24
	6	140	33	139	47	138	58	138	07	137	10	136	08	135	01
	10	147	10	146	33	145	52	145	10	144	24	143	03	142	30
	14	153	46	153	16	152	44	152	10	151	34	150	54	150	12
	18	160	21	160	00	159	36	159	10	158	42	158	13	157	41
	22	166	55	166	40	166	24	166	07	165	50	165	29	165	08
	26	173	26	173	19	173	12	173	03	172	56	172	44	172	25
	30	180	00	180	00	180	00	180	00	180	00	180	00	180	00

A Table of the Oblique Aſcenſions of the *Ecliptique* from 0. to 67 degrees of Latitude.

Elevation of the Pole.

		61	62	63	64	65	66	67
S	D	D ′	D ′	D ′	D ′	D ′	D ′	D ′
♎	0	180 00	180 00	180 00	180 00	180 00	180 00	189 00
	4	186 34	186 41	186 48	186 57	187 04	187 16	187 35
	8	193 05	193 20	193 36	193 53	194 10	194 31	194 51
	12	199 39	200 00	200 24	200 50	201 18	201 47	202 19
	16	206 14	206 44	207 16	207 50	208 26	209 06	209 48
	20	212 50	213 27	214 08	214 50	215 36	216 27	217 30
	24	219 27	220 13	221 02	221 53	222 50	223 52	224 49
	28	226 07	227 01	227 58	229 00	230 06	231 20	232 36
♏	2	232 46	233 49	234 54	236 08	237 26	238 52	240 21
	6	239 27	240 38	241 54	243 18	244 49	246 27	248 16
	10	246 10	247 30	248 57	250 31	252 15	254 09	256 14
	14	252 52	254 22	255 59	257 47	259 43	261 55	264 19
	18	259 34	261 13	263 02	265 03	267 14	269 45	272 30
	22	266 14	268 05	270 06	272 19	274 47	277 39	280 52
	26	272 51	274 53	277 06	279 35	282 23	285 35	289 19
♐	0	279 23	281 38	284 04	286 48	289 59	293 35	297 58
	4	285 50	288 15	290 55	293 58	297 28	301 35	306 43
	8	292 06	294 05	297 36	300 56	304 49	309 37	316 08
	12	298 10	300 55	304 04	307 43	312 02	317 41	327 40
	16	304 01	306 38	310 15	314 11	319 01	325 48	340 37
	20	309 32	312 15	316 03	320 17	325 33	333 59	
	24	314 42	317 39	321 29	325 54	331 34	342 14	
	28	319 27	322 55	326 23	330 56	336 49	348 50	
♑	2	323 51	327 55	330 47	335 18	341 11	353 11	
	6	327 47	330 32	334 34	339 00	344 42	355 11	
	10	331 16	334 50	337 50	342 00	347 16	355 48	
	14	334 26	337 39	340 42	344 38	349 26	356 22	
	18	337 12	339 04	343 06	346 45	351 06	356 52	
	22	339 40	342 58	345 10	348 29	352 23	357 18	
	26	341 52	344 20	346 56	349 57	353 26	357 40	
♒	0	343 47	346 21	348 27	351 13	354 19	357 58	
	4	345 31	347 28	349 46	352 15	355 03	358 14	
	8	347 06	348 15	350 56	353 11	355 41	358 29	
	12	348 31	350 54	351 59	353 59	356 13	358 40	
	16	349 50	351 10	352 56	354 44	356 41	358 51	
	20	350 00	352 18	353 48	355 22	357 06	358 59	
	24	352 06	353 16	354 35	355 58	357 29	359 07	
	28	353 09	354 11	355 18	356 30	357 49	359 14	
♓	2	354 07	355 19	355 58	357 00	358 08	359 21	
	6	355 03	355 39	356 38	357 29	358 26	359 28	
	10	355 56	356 28	357 14	357 57	358 43	359 33	
	14	356 48	357 12	357 50	358 23	358 59	359 40	
	18	357 36	357 58	358 22	358 48	359 15	359 45	
	22	358 25	358 39	358 55	359 13	359 30	359 50	
	26	359 14	359 21	359 28	359 37	359 45	359 56	
	30	360 00	360 00	360 00	360 00	360 00	360 00	

The Sexagenarie Table, ſerving for *Multiplication*, *Diviſion*, and for finding the Part Proportionall.

	1	2	3	4	5	6	7	8	9	10
1	0 01	0 02	0 03	0 04	0 05	0 06	0 07	0 08	0 09	0 1
2	0 02	0 04	0 06	0 08	0 10	0 12	0 14	0 16	0 18	0 20
3	0 03	0 06	0 09	0 12	0 15	0 18	0 21	0 24	0 27	0 30
4	0 04	0 08	0 12	0 16	0 20	0 24	0 28	0 32	0 36	0 40
5	0 05	0 10	0 15	0 20	0 25	0 30	0 35	0 40	0 45	0 50
6	0 06	0 12	0 18	0 24	0 30	0 36	0 42	0 48	0 54	1 00
7	0 07	0 14	0 21	0 28	0 35	0 42	0 49	0 56	1 03	1 10
8	0 08	0 16	0 24	0 32	0 40	0 48	0 56	1 04	1 12	1 20
9	0 09	0 18	0 27	0 36	0 45	0 54	1 03	1 12	1 21	1 30
10	0 10	0 20	0 30	0 40	0 50	1 00	1 10	1 20	1 30	1 40
11	0 11	0 22	0 33	0 44	0 55	1 06	1 17	1 28	1 39	1 50
12	0 12	0 24	0 36	0 48	1 00	1 12	1 24	1 36	1 48	2 00
13	0 13	0 26	0 39	0 52	1 05	1 18	1 31	1 44	1 57	2 10
14	0 14	0 28	0 42	0 56	1 10	1 24	1 38	1 52	2 06	2 20
15	0 15	0 30	0 45	1 00	1 15	1 30	1 45	2 00	2 15	2 30
16	0 16	0 32	0 48	1 04	1 20	1 36	1 52	2 08	2 24	2 40
17	0 17	0 34	0 51	1 08	1 25	1 42	1 59	2 16	2 33	2 50
18	0 18	0 36	0 54	1 12	1 30	1 48	2 06	2 24	2 42	3 00
19	0 19	0 38	0 57	1 16	1 35	1 54	2 13	2 32	2 51	3 10
20	0 20	0 40	1 00	1 20	1 40	2 00	2 20	2 40	3 00	3 20
21	0 21	0 42	1 03	1 24	1 45	2 06	2 27	2 48	3 09	3 30
22	0 22	0 44	1 06	1 28	1 50	2 12	2 34	2 56	3 18	3 40
23	0 23	0 46	1 09	1 32	1 55	2 18	2 41	3 04	3 27	3 50
24	0 24	0 48	1 12	1 36	2 00	2 24	2 48	3 12	3 36	4 00
25	0 25	0 50	1 15	1 40	2 05	2 30	2 55	3 20	3 45	4 10
26	0 26	0 52	1 18	1 44	2 10	2 36	3 02	3 28	3 54	4 20
27	0 27	0 54	1 21	1 48	2 15	2 42	3 09	3 36	4 03	4 30
28	0 28	0 56	1 24	1 52	2 20	2 48	3 16	3 44	4 12	4 40
29	0 29	0 58	1 27	1 56	2 25	2 54	3 23	3 52	4 21	4 50
30	0 30	1 00	1 30	2 00	2 30	3 00	3 30	4 00	4 30	5 00
31	0 31	1 02	1 33	2 04	2 35	3 06	3 37	4 08	4 39	5 10
32	0 32	1 04	1 36	2 08	2 40	3 12	3 44	4 16	4 48	5 20
33	0 33	1 06	1 39	2 12	2 45	3 18	3 51	4 24	4 57	5 30
34	0 34	1 08	1 42	2 16	2 50	3 24	3 58	4 32	5 06	5 4
35	0 35	1 10	1 45	2 20	2 55	3 30	4 05	4 40	5 15	5 50
36	0 36	1 12	1 48	2 24	3 00	3 36	4 12	4 48	5 24	6 00
37	0 37	1 14	1 51	2 28	3 05	3 42	4 19	4 56	5 33	6 10
38	0 38	1 16	1 54	2 32	3 10	3 48	4 26	5 04	5 42	6 20
39	0 39	1 18	1 57	2 36	3 15	3 54	4 33	5 12	5 51	6 30
40	0 40	1 20	2 00	2 40	3 20	4 00	4 40	5 20	6 00	6 40
41	0 41	1 22	2 03	2 44	3 25	4 06	4 47	5 28	6 09	6 50
42	0 42	1 24	2 06	2 48	3 30	4 12	4 54	5 36	6 18	7 00
43	0 43	1 26	2 09	2 52	3 35	4 18	5 01	5 44	6 27	7 10
44	0 44	1 28	2 12	2 56	3 40	4 24	5 08	5 52	6 36	7 20
45	0 45	1 30	2 15	3 00	3 45	4 30	5 15	6 00	6 45	7 30
46	0 46	1 32	2 18	3 04	3 50	4 36	5 22	6 08	6 54	7 40
47	0 47	1 34	2 21	3 08	3 55	4 42	5 29	6 16	7 03	7 50
48	0 48	1 36	2 24	3 12	4 00	4 48	5 36	6 24	7 12	8 00
49	0 49	1 38	2 27	3 16	4 05	4 54	5 43	6 32	7 21	8 10
50	0 50	1 40	2 30	3 20	4 10	5 00	5 50	6 40	7 30	8 20
51	0 51	1 42	2 33	3 24	4 15	5 06	5 57	6 48	7 39	8 30
52	0 52	1 44	2 36	3 28	4 20	5 12	6 04	6 56	7 48	8 40
53	0 53	1 46	2 39	3 32	4 25	5 18	6 11	7 04	7 57	8 50
54	0 54	1 48	2 42	3 36	4 30	5 24	6 18	7 12	8 06	9 00
55	0 55	1 50	2 45	3 40	4 35	5 30	6 25	7 20	8 15	9 10
56	0 56	1 52	2 48	3 44	4 40	5 36	6 32	7 28	8 24	9 20
57	0 57	1 54	2 51	3 48	4 45	5 42	6 39	7 36	8 33	9 30
58	0 58	1 56	2 54	3 52	4 50	5 48	6 46	7 44	8 42	9 40
59	0 59	1 58	2 57	3 56	4 55	5 54	6 53	7 52	8 51	9 50
60	1 00	2 00	3 00	4 00	5 00	6 00	7 00	8 00	9 00	10 00

The Sexagenarie Table, ſerving for *Multiplication*, *Diviſion*, and for finding the Part Proportionall.

	11	12	13	14	15	16	17	18	19	20
1	00 11	00 12	00 13	00 14	00 15	00 16	00 17	00 18	00 19	00 20
2	00 22	00 24	00 26	00 28	00 30	00 32	00 34	00 36	00 38	00 40
3	00 33	00 36	00 39	00 42	00 45	00 48	00 51	00 54	00 57	01 00
4	00 44	00 48	00 52	00 56	01 00	01 04	01 08	01 12	01 16	01 20
5	00 55	01 00	01 05	01 10	01 15	01 20	01 25	01 30	01 35	01 40
6	01 06	01 12	01 18	01 24	01 30	01 36	01 42	01 48	01 54	02 00
7	01 17	01 24	01 31	01 38	01 45	01 52	02 59	02 06	02 13	02 20
8	01 28	01 36	01 44	01 52	02 00	02 08	02 16	02 24	02 32	02 40
9	01 39	01 48	01 57	02 06	02 15	02 24	02 33	02 42	02 51	03 00
10	01 50	02 00	02 10	02 20	02 30	02 40	02 50	03 00	03 10	03 20
11	02 01	02 12	02 23	02 34	02 45	02 56	03 07	03 18	03 29	03 40
12	02 12	02 24	02 36	02 48	03 00	03 12	03 24	03 36	03 48	04 00
13	02 23	02 36	02 49	03 02	03 15	03 28	03 41	03 54	04 07	04 20
14	02 34	02 48	03 02	03 16	03 30	03 44	03 58	04 12	04 26	04 40
15	02 45	03 00	03 15	03 30	03 45	04 00	04 15	04 30	04 45	05 00
16	02 56	03 12	03 28	03 44	04 00	04 16	04 32	04 48	05 04	05 20
17	03 07	03 24	03 41	03 58	04 15	04 32	04 49	05 06	05 23	05 40
18	03 18	03 36	03 54	04 12	04 30	04 48	05 06	05 24	05 42	06 00
19	03 29	03 48	04 07	04 26	04 45	05 04	05 23	05 42	06 01	06 20
20	03 40	04 00	04 20	04 40	05 00	05 20	05 40	06 00	06 20	06 40
21	03 51	04 12	04 33	04 54	05 15	05 36	05 57	06 18	06 39	07 00
22	04 02	04 24	04 46	05 08	05 30	05 52	06 16	06 36	06 58	07 20
23	04 13	04 36	04 59	05 22	05 45	06 08	06 31	6 54	07 17	07 40
24	04 24	04 48	05 12	05 36	06 00	06 24	06 48	07 12	07 36	08 00
25	04 35	05 00	05 25	05 50	06 15	06 40	07 05	07 30	07 55	08 20
26	04 46	05 12	05 38	06 04	06 30	06 56	07 22	07 48	08 14	08 40
27	04 57	05 24	05 51	06 18	06 45	07 12	07 39	08 06	08 33	09 00
28	05 08	05 36	06 04	06 32	07 00	07 28	07 56	08 24	08 52	09 20
29	05 19	05 48	06 17	06 46	07 15	07 44	08 13	08 42	09 11	09 40
30	05 30	06 00	06 30	07 00	07 30	08 00	08 30	09 00	09 30	10 00
31	05 41	06 12	06 43	07 14	07 45	08 16	08 47	09 18	09 49	10 20
32	05 52	06 24	06 56	07 28	08 00	08 32	09 04	09 36	10 08	10 40
33	06 03	06 36	07 09	07 42	08 15	08 48	09 21	09 54	10 27	11 00
34	06 14	06 48	07 22	07 56	08 30	09 04	09 38	10 12	10 46	11 20
35	06 25	07 00	07 35	08 10	08 45	09 20	09 55	10 30	11 05	11 40
36	06 36	07 12	07 48	08 24	09 00	09 36	10 12	10 48	11 24	12 00
37	06 47	07 24	08 01	08 38	09 15	09 52	10 29	11 06	11 43	12 2
38	06 58	07 36	08 14	08 52	09 30	10 08	10 46	11 24	12 02	12 40
39	07 09	07 48	08 27	09 06	09 45	10 24	11 03	11 42	12 21	13 00
40	07 20	08 00	08 40	09 20	10 00	10 40	11 20	12 00	12 40	13 20
41	07 31	08 12	08 53	09 34	10 15	10 56	11 37	12 18	12 59	13 40
42	07 42	08 24	09 06	09 48	10 30	11 12	11 54	12 36	13 18	14 00
43	07 53	08 36	09 19	10 02	10 45	11 28	12 11	12 54	13 37	14 2
44	08 04	08 48	09 32	10 16	11 00	11 44	12 28	13 12	13 56	14 40
45	08 15	09 00	09 45	10 30	11 15	12 00	12 45	13 30	14 15	15 00
46	08 26	09 12	09 58	10 44	11 30	12 16	13 02	13 48	14 34	15 20
47	08 37	09 24	10 11	10 58	11 45	12 32	13 19	14 06	14 53	15 4
48	08 48	09 36	10 24	11 12	12 00	12 48	13 36	14 24	15 12	16 00
49	08 59	09 48	10 37	11 26	12 15	13 04	13 53	14 42	15 31	16 20
50	09 10	10 00	10 50	11 40	12 30	13 20	14 10	15 00	15 50	16 40
51	09 21	10 12	11 03	11 54	12 45	13 36	14 27	15 18	16 09	17 00
52	09 32	10 24	11 16	12 08	13 00	13 52	14 44	15 36	16 28	17 20
53	09 43	10 36	11 29	12 22	13 15	14 08	15 01	15 54	16 47	17 40
54	09 54	10 48	11 42	12 36	13 30	14 24	15 18	16 12	17 06	18 0
55	10 05	11 00	11 55	12 50	13 45	14 40	15 35	16 30	17 25	18 20
56	10 16	11 12	12 08	13 04	14 00	14 56	15 52	16 48	17 44	18 4
57	10 27	11 24	12 21	13 18	14 15	15 12	16 09	17 06	18 03	19 00
58	10 38	11 36	12 34	13 32	14 30	15 28	16 26	17 24	18 22	19 20
59	10 49	11 48	12 47	13 46	14 45	15 44	16 43	17 42	18 41	19 40
60	11 00	12 00	13 00	14 00	15 00	16 00	17 00	18 00	19 00	20 00

The Sexagenarie Table, ſerving for *Mnltiplication*, *Diviſion*, and for finding the Part Proportionall.

	21	22	23	24	25	26	27	28	29	30
1	00 21	00 22	00 23	00 24	00 25	00 26	00 27	00 28	00 29	00 30
2	00 42	00 44	00 46	00 48	00 50	00 52	00 54	00 56	00 58	01 00
3	01 03	01 06	01 09	01 12	01 15	01 18	01 21	01 24	01 27	01 30
4	01 24	01 28	01 32	01 36	01 40	01 44	01 48	01 52	01 56	02 00
5	01 45	01 50	01 55	02 00	02 05	02 10	02 15	02 20	02 25	02 30
6	02 06	02 12	02 18	02 24	02 30	02 36	02 42	02 48	02 54	03 00
7	02 27	02 34	02 41	02 48	02 55	03 02	03 09	03 16	03 23	03 30
8	02 48	02 56	03 04	03 42	03 20	03 28	03 36	03 44	03 52	04 00
9	03 09	03 18	03 27	03 36	03 45	03 54	04 03	04 12	04 21	04 30
10	03 30	03 40	03 50	04 00	04 10	04 20	04 30	04 40	04 50	05 00
11	03 51	04 02	04 13	04 24	04 35	04 46	04 57	05 08	05 19	05 30
12	04 12	04 24	04 36	04 48	05 00	05 12	05 24	05 36	05 48	06 00
13	04 33	04 46	04 59	05 12	05 25	05 38	05 51	06 04	06 17	06 30
14	04 54	05 08	05 22	05 36	05 50	06 4	06 18	06 32	06 46	07 00
15	05 15	05 30	05 45	06 00	06 15	06 30	06 45	07 00	07 15	07 30
16	05 36	05 52	06 08	06 24	06 40	06 56	07 12	07 28	07 44	08 00
17	05 57	06 14	06 31	06 48	07 05	07 22	07 39	07 56	08 13	08 30
18	06 18	06 36	06 54	07 12	07 30	07 48	08 06	08 24	08 42	09 00
19	06 39	06 58	07 17	07 36	07 55	08 14	08 33	08 52	09 11	09 30
20	07 00	07 20	07 40	08 00	08 20	08 40	09 00	09 20	09 40	10 00
21	07 21	07 42	08 03	08 24	08 45	09 06	09 27	09 48	10 09	10 30
22	07 42	08 04	08 26	08 48	9 10	09 32	9 54	10 16	10 38	11 00
23	08 03	08 26	08 49	09 12	09 35	09 58	10 21	10 44	11 07	11 30
24	08 24	08 48	09 12	09 36	10 00	10 24	10 48	11 12	11 36	12 00
25	08 45	09 10	09 35	10 00	10 25	10 50	11 15	11 40	12 05	12 30
26	09 06	09 32	09 58	10 24	10 50	11 16	11 42	12 08	12 34	13 00
27	09 27	09 54	10 21	10 48	11 15	11 42	12 09	12 36	13 03	13 30
28	09 48	10 16	10 44	11 12	11 40	12 08	12 36	13 04	13 32	14 00
29	10 09	10 38	11 07	11 36	12 05	12 34	13 03	13 32	14 01	14 30
30	10 30	11 00	11 30	12 00	12 30	13 00	13 30	14 00	14 30	15 00
31	10 51	11 22	11 53	12 24	12 55	13 26	13 57	14 28	14 59	15 30
32	11 12	11 44	12 16	12 48	13 20	13 52	14 24	14 56	15 28	16 00
33	11 33	12 06	12 39	13 12	13 45	14 18	14 51	15 24	15 57	16 30
34	11 54	12 28	13 02	13 36	14 10	14 44	15 18	15 52	16 26	17 00
35	12 15	12 50	13 25	14 00	14 35	15 10	15 45	16 20	16 55	17 30
36	12 36	13 12	13 48	14 24	15 00	15 36	16 12	16 48	17 24	18 00
37	12 57	13 34	14 11	14 48	15 25	16 02	16 39	17 16	17 53	18 30
38	13 18	13 56	14 34	15 12	15 50	16 28	17 06	17 44	18 22	19 00
39	13 39	14 18	14 57	15 36	16 15	16 54	17 33	18 12	18 51	19 30
40	14 00	14 40	15 20	16 00	16 40	17 20	18 00	18 40	19 20	20 00
41	14 21	15 02	15 43	16 24	17 05	17 46	18 27	19 08	19 49	20 30
42	14 42	15 24	16 06	16 48	17 30	18 12	18 54	19 36	20 18	21 00
43	15 03	15 46	16 29	17 12	17 55	18 38	19 21	20 04	20 47	21 30
44	15 24	16 08	16 52	17 36	18 20	19 04	19 48	20 32	21 16	22 00
45	15 45	16 30	17 15	18 00	18 45	19 30	20 15	21 00	21 45	22 30
46	16 06	16 52	17 38	18 24	19 10	19 56	20 42	21 28	22 14	23 00
47	16 27	17 14	18 01	18 48	19 35	20 22	21 09	22 56	22 43	23 30
48	16 48	17 36	18 24	19 12	20 00	20 48	21 36	22 24	23 12	24 00
49	17 09	17 58	18 47	19 36	20 25	21 14	22 03	22 52	23 41	24 30
50	17 30	18 20	19 10	20 00	20 50	21 40	22 30	23 20	24 10	25 00
51	17 51	18 42	19 33	20 24	21 15	22 06	22 57	23 48	24 39	25 30
52	18 12	19 04	19 56	20 48	21 40	22 32	23 24	24 16	25 08	26 00
53	18 33	19 26	20 19	21 12	22 05	22 58	23 51	24 44	25 37	26 30
54	18 54	19 48	20 42	21 36	22 30	23 24	24 18	25 12	26 06	27 00
55	19 15	20 10	21 05	22 00	22 55	23 50	24 45	25 40	26 35	27 30
56	19 36	20 32	21 28	22 24	23 20	24 16	25 12	26 08	27 04	28 00
57	19 57	20 54	21 51	22 48	23 45	24 42	25 39	26 36	27 33	28 30
58	20 18	21 16	22 14	23 12	24 10	25 08	26 06	27 04	28 02	29 00
59	20 39	21 38	22 37	23 36	24 35	25 34	26 33	27 32	28 31	29 30
60	21 00	22 00	23 00	24 00	25 00	26 00	27 00	28 00	29 00	30 00

The Sexagenarie Table, ſerving for *Multiplication*, *Diviſion*, and for finding the Part Proportionall.

	31	32	33	34	35	36	37	38	39	40
1	00 31	00 32	00 33	00 34	00 35	00 36	00 37	00 38	00 39	00 40
2	01 02	01 04	01 06	01 08	01 10	01 12	01 14	01 16	01 18	01 20
3	01 33	01 36	01 39	01 42	01 45	01 48	01 51	01 54	01 57	02 00
4	02 04	02 08	02 12	02 16	02 20	02 24	02 28	02 32	02 36	02 40
5	02 35	02 40	02 45	02 50	02 55	03 00	03 05	03 10	03 15	03 20
6	03 06	03 12	03 18	03 24	03 30	03 36	03 42	03 48	03 54	04 00
7	03 37	03 44	03 51	03 58	04 05	04 12	04 19	04 26	04 33	04 40
8	04 08	04 16	04 24	04 32	04 40	04 48	04 56	05 04	05 12	05 20
9	04 39	04 48	04 57	05 06	05 15	05 24	05 33	05 42	05 51	06 00
10	05 10	05 20	05 30	05 40	05 50	06 00	06 10	06 20	06 30	06 40
11	05 41	05 52	06 03	06 14	06 25	06 36	06 47	06 58	07 09	07 20
12	06 12	06 24	06 36	06 48	07 00	07 12	07 24	07 36	07 48	08 00
13	06 43	06 56	07 09	07 22	07 35	07 48	08 01	08 14	08 27	08 40
14	07 14	07 28	07 42	07 56	08 10	08 24	08 38	08 52	09 06	09 20
15	07 45	08 00	08 15	08 30	08 45	09 00	09 15	09 30	09 45	10 00
16	08 16	08 32	08 48	09 04	09 20	09 36	09 52	10 08	10 24	10 40
17	08 47	09 04	09 21	09 38	09 55	10 12	10 29	10 46	11 03	11 20
18	09 18	09 36	09 54	10 12	10 30	10 48	11 06	11 24	11 42	12 00
19	09 49	10 08	10 27	10 46	11 05	11 24	11 43	12 02	12 21	12 40
20	10 20	10 40	11 00	11 20	11 40	12 00	12 20	12 40	13 00	13 20
21	10 51	11 12	11 33	11 54	12 15	12 36	12 57	13 18	13 39	14 00
22	11 23	11 44	12 06	12 28	12 50	13 12	13 34	13 56	14 18	14 40
23	11 52	12 16	12 39	13 02	13 25	13 48	14 11	14 34	14 57	15 20
24	12 24	12 48	13 12	13 36	14 00	14 24	14 48	15 12	15 36	16 06
25	12 55	13 20	13 45	14 10	14 35	15 00	15 25	15 50	16 15	16 40
26	13 26	13 52	14 18	14 44	15 10	15 36	16 02	16 28	16 54	17 20
27	13 57	14 24	14 51	15 18	15 45	16 12	16 39	17 06	17 33	18 00
28	14 28	14 56	15 24	15 52	16 20	16 48	17 16	17 44	18 12	18 40
29	14 59	15 28	15 57	16 26	16 55	17 24	17 53	18 22	19 51	19 00
30	15 30	16 00	16 30	17 00	17 30	18 00	18 30	19 00	19 30	20 20
31	16 01	16 32	17 03	17 34	18 05	18 36	19 07	19 38	20 09	20 40
32	16 32	17 04	17 36	18 08	18 40	19 12	19 44	20 16	20 48	21 20
33	17 03	17 36	18 09	18 42	19 15	19 48	20 21	20 54	21 27	22 00
34	17 34	18 08	18 42	19 16	19 50	20 24	20 58	21 32	22 06	22 40
35	18 05	18 40	19 15	19 50	20 25	21 00	21 35	22 10	22 45	23 20
36	18 36	19 12	19 48	20 24	21 00	21 36	22 12	22 44	23 24	24 00
37	19 07	19 44	20 21	20 58	21 35	22 12	22 49	23 26	24 03	24 40
38	19 38	20 16	20 54	21 32	22 10	22 48	23 26	24 04	24 42	25 20
39	20 09	20 48	21 27	22 06	22 45	23 24	24 03	24 42	25 21	26 00
40	20 40	21 20	22 00	22 40	23 20	24 00	24 40	25 20	26 00	26 40
41	21 11	21 52	22 33	23 14	23 55	24 36	25 17	25 58	26 39	27 20
42	21 42	22 24	23 06	23 48	24 30	25 12	25 54	26 36	27 18	28 00
43	22 13	22 56	23 39	24 22	25 05	25 48	26 31	27 14	27 57	28 40
44	22 44	23 28	24 12	24 56	25 40	26 24	27 08	27 52	28 36	29 20
45	23 15	24 00	24 45	25 30	26 15	27 00	27 45	28 30	29 15	30 00
46	23 46	24 32	25 18	26 04	26 50	27 36	28 22	29 08	29 54	30 40
47	24 17	25 04	25 51	26 38	27 25	28 12	28 59	29 46	30 33	31 20
48	24 48	25 36	26 24	27 12	28 00	28 48	29 36	30 24	31 12	32 00
49	25 19	26 08	26 57	27 46	28 35	29 24	30 13	31 02	31 51	32 40
50	25 50	26 40	27 30	28 20	29 10	30 00	30 50	31 40	32 30	33 20
51	26 21	27 12	28 03	28 54	29 45	30 36	31 27	32 18	33 09	34 00
52	26 52	27 44	28 36	29 28	30 20	31 12	32 04	32 56	33 48	34 40
53	27 23	28 16	29 09	30 02	30 55	31 48	32 41	33 34	34 27	35 20
54	27 54	28 48	29 42	30 36	31 30	32 24	33 18	34 12	35 06	36 00
55	28 25	29 20	30 15	31 10	32 05	33 00	34 55	34 50	35 45	36 40
56	28 56	29 52	30 48	31 44	32 40	33 36	34 32	35 28	36 24	37 20
57	29 27	30 24	31 21	32 18	33 15	34 12	35 09	36 06	37 03	38 00
58	29 58	30 56	31 54	32 52	33 50	34 48	35 46	36 44	37 42	38 40
59	30 29	31 28	32 27	33 26	34 25	35 24	36 23	37 22	38 21	39 20
60	31 00	32 00	33 00	34 00	35 00	36 00	37 00	38 00	39 00	40 00

The Sexagenarie Table, ſerving for *Multiplication*, *Diviſion*, and for finding the Part Proportionall.

	41	42	43	44	45	46	47	48	49	50
1	00 41	00 42	00 43	00 44	00 45	00 46	00 47	00 48	00 49	00 50
2	01 22	01 24	01 26	01 28	01 30	01 32	01 34	01 36	01 38	01 40
3	02 03	02 06	02 09	02 12	02 15	02 18	02 21	02 24	02 27	02 30
4	02 44	02 48	02 52	02 56	03 00	03 04	03 08	03 12	03 16	03 20
5	03 25	03 30	03 35	03 40	03 45	03 50	03 55	04 00	04 05	04 10
6	04 06	04 12	04 18	04 24	04 30	04 36	04 42	04 48	04 54	05 00
7	04 47	04 54	05 01	05 08	05 15	05 22	05 29	05 36	05 43	05 50
8	05 28	05 36	05 44	05 52	06 00	06 08	06 16	06 24	06 32	06 40
9	06 09	06 18	06 27	06 36	06 45	06 54	07 03	07 12	07 21	07 30
10	06 50	07 00	07 10	07 20	07 30	07 40	07 50	08 00	08 10	08 20
11	07 31	07 42	07 53	08 04	08 15	08 26	08 37	08 48	08 59	09 10
12	08 12	08 24	08 36	08 48	09 00	09 12	09 24	09 36	09 48	10 00
13	08 53	09 06	09 19	09 32	09 45	09 58	10 11	10 24	10 37	10 50
14	09 34	09 48	10 02	10 16	10 30	10 44	10 58	11 12	11 26	11 40
15	10 15	10 30	10 45	11 00	11 15	11 30	11 45	12 00	12 15	12 30
16	10 56	11 12	11 28	11 44	12 00	12 16	12 32	12 48	13 04	13 20
17	11 37	11 54	12 11	12 28	12 45	13 02	13 19	13 36	13 53	14 10
18	12 18	12 36	12 54	13 12	13 30	13 48	14 06	14 24	14 42	15 00
19	12 59	13 18	13 37	13 56	14 15	14 34	14 53	15 12	15 31	15 50
20	13 40	14 00	14 20	14 40	15 00	15 20	15 40	16 00	16 20	16 40
21	14 21	14 42	15 03	15 24	15 45	16 06	16 27	16 48	17 09	17 30
22	15 02	15 24	15 46	16 08	16 30	16 52	17 14	17 36	17 58	18 20
23	15 43	16 06	16 29	16 52	17 15	17 38	18 01	18 24	18 47	19 10
24	16 24	16 48	17 12	17 36	18 00	18 24	18 48	19 12	19 36	20 00
25	17 05	17 30	17 55	18 20	18 45	19 10	19 35	20 00	20 25	20 50
26	17 46	18 12	18 38	19 04	19 30	19 56	20 22	20 48	21 14	21 40
27	18 27	18 54	19 21	19 48	20 15	20 42	21 09	21 36	22 03	22 30
28	19 08	19 36	20 04	20 32	21 00	21 28	21 56	22 24	22 52	23 20
29	19 49	20 18	20 47	21 16	21 45	22 14	22 43	23 12	23 41	24 10
30	20 30	21 00	21 30	22 00	22 30	23 00	23 30	24 00	24 30	25 00
31	21 11	21 42	22 13	22 44	23 15	23 46	24 17	24 48	25 19	25 50
32	21 52	22 24	22 56	23 28	24 00	24 32	25 04	25 36	26 08	26 40
33	22 33	23 06	23 39	24 12	24 45	25 18	25 51	26 24	26 57	27 30
34	23 14	23 48	24 22	24 56	25 30	26 04	26 38	27 12	27 46	28 20
35	23 55	24 30	25 05	25 40	26 15	26 50	27 25	28 00	28 35	29 10
36	24 36	25 12	25 48	26 24	27 00	27 36	28 12	28 48	29 24	30 00
37	25 17	25 54	26 31	27 08	27 45	28 22	28 59	29 36	30 13	30 50
38	25 58	26 36	27 14	27 52	28 30	29 08	29 46	30 24	31 02	31 40
39	26 39	27 18	27 57	28 36	29 15	29 54	30 33	31 12	31 51	32 30
40	27 20	28 00	28 40	29 20	30 00	30 40	31 20	32 00	32 40	33 20
41	28 01	28 42	29 23	30 04	30 45	31 26	32 07	32 48	33 29	34 10
42	28 42	29 24	30 06	30 48	31 30	32 12	32 54	33 36	34 18	35 00
43	29 23	30 06	30 49	31 32	32 15	32 58	33 41	34 24	35 07	35 50
44	30 04	30 48	31 32	32 16	33 00	33 44	34 28	35 12	35 56	36 40
45	30 45	31 30	32 15	33 00	33 45	34 30	35 15	36 00	36 45	37 30
46	31 26	32 12	32 58	33 44	34 30	35 16	36 02	36 48	37 34	38 20
47	32 07	32 54	33 41	34 28	35 15	36 02	36 49	37 36	38 23	39 10
48	32 48	33 36	34 24	35 12	36 00	36 48	37 36	38 24	39 12	40 00
49	33 29	34 18	35 07	35 56	36 45	37 34	38 23	39 12	40 01	40 50
50	34 10	35 00	35 50	36 40	37 30	38 20	39 10	40 00	40 50	41 40
51	34 51	35 42	36 33	37 24	38 15	39 06	39 57	40 48	41 39	42 30
52	35 32	36 24	37 16	38 08	39 00	39 52	40 44	41 36	42 28	43 20
53	36 13	37 06	37 59	38 52	39 45	40 38	41 31	42 24	43 17	44 10
54	36 54	37 48	38 42	39 36	40 30	41 24	42 18	43 12	44 06	45 00
55	37 35	38 30	39 25	40 20	41 15	42 10	43 05	44 00	44 55	45 50
56	38 16	39 12	40 08	41 04	42 00	42 56	43 52	44 48	45 44	46 40
57	38 57	39 54	40 51	41 48	42 45	43 42	44 39	45 36	46 33	47 30
58	39 38	40 36	41 34	42 32	43 30	44 28	45 26	46 24	47 22	48 20
59	40 19	41 18	42 17	43 16	44 15	45 14	46 13	47 12	48 11	49 10
60	41 00	42 00	43 00	44 00	45 00	46 00	47 00	48 00	49 00	50 00

The Sexagenarie Table, ſerving for *Mnltiplication*, *Diviſion*, and for finding the Part Proportionall.

	51	52	53	54	55	56	57	58	59	60
1	00 51	00 52	00 53	00 54	00 55	00 56	00 57	00 58	00 59	01 00
2	01 42	01 44	01 46	01 48	01 50	01 52	01 54	01 56	01 58	02 00
3	02 33	02 36	02 39	02 42	02 45	02 48	02 51	02 54	02 57	03 00
4	03 24	03 28	03 32	03 36	03 40	03 44	03 48	03 52	03 56	04 00
5	04 15	04 20	04 25	04 30	04 35	04 40	04 45	04 50	04 55	05 00
6	05 06	05 12	05 18	05 24	05 30	05 36	05 42	05 48	05 54	06 00
7	05 57	06 04	06 11	06 18	06 25	06 32	06 39	06 46	06 53	07 00
8	06 48	06 56	07 04	07 12	07 20	07 28	07 36	07 44	07 52	08 00
9	07 39	07 48	07 57	08 06	08 15	08 24	08 33	08 42	08 51	09 00
10	08 30	08 40	08 50	09 00	09 10	09 20	09 30	09 40	09 50	10 00
11	09 21	09 32	09 43	09 54	10 05	10 16	10 27	10 38	10 49	11 00
12	10 12	10 24	10 36	10 48	11 00	11 12	11 24	11 36	11 48	12 00
13	11 03	11 16	11 29	11 42	11 55	12 08	12 21	12 34	12 47	13 00
14	11 54	12 08	12 22	12 36	12 50	13 04	13 18	13 32	13 46	14 00
15	12 45	13 00	13 15	13 20	13 45	14 00	14 15	14 30	14 45	15 00
16	13 36	13 52	14 08	14 24	14 40	14 56	15 12	15 28	15 44	16 00
17	14 27	14 44	15 01	15 18	15 35	15 52	16 09	16 26	16 43	17 00
18	15 18	15 36	15 54	16 12	16 30	16 48	17 06	17 24	17 42	18 00
19	16 09	16 28	16 47	17 06	17 25	17 44	18 03	18 22	18 41	19 00
20	17 00	17 20	17 40	18 00	18 20	18 40	19 00	19 20	19 40	20 00
21	17 51	18 12	18 33	18 54	19 15	19 36	19 57	20 18	20 39	21 00
22	18 42	19 04	19 26	19 48	20 10	20 32	20 54	21 16	21 38	22 00
23	19 33	19 56	20 19	20 42	21 05	21 28	21 51	22 14	22 37	23 00
24	20 24	20 48	21 12	21 36	22 00	22 24	22 48	23 12	23 36	24 00
25	21 15	21 40	22 05	22 30	22 55	23 20	23 45	24 10	24 35	25 00
26	22 06	22 32	22 58	23 24	23 50	24 16	24 42	25 08	25 34	26 00
27	22 57	23 24	23 51	24 18	24 45	25 12	25 39	26 06	26 33	27 00
28	23 48	24 16	24 44	25 12	25 40	26 08	26 36	27 04	27 32	28 00
29	24 39	25 08	25 37	26 06	26 35	27 04	27 33	28 02	28 31	29 00
30	25 30	26 00	26 30	27 00	27 30	28 00	28 30	29 00	29 30	30 00
31	26 21	26 52	27 23	27 54	28 25	28 56	29 27	29 58	30 29	31 00
32	27 12	27 44	28 16	28 48	29 20	29 52	30 24	30 56	31 28	32 00
33	28 03	28 36	29 09	29 42	30 15	30 48	31 21	31 54	32 27	33 00
34	28 54	29 28	30 02	30 36	31 10	31 44	32 18	32 52	33 26	34 00
35	29 45	30 20	30 55	31 30	32 05	32 40	33 15	33 50	34 25	35 00
36	30 36	31 12	31 48	32 24	33 00	33 36	34 12	34 48	35 24	36 00
37	31 27	32 04	32 41	33 18	33 55	34 32	35 09	35 46	36 23	37 00
38	32 18	32 56	33 34	34 12	34 50	35 28	36 06	36 44	37 22	38 00
39	33 09	33 48	34 27	35 06	35 45	36 24	37 03	37 42	38 21	39 00
40	34 00	34 40	35 20	36 00	36 40	37 20	38 00	38 40	39 20	40 00
41	34 51	35 32	36 13	36 54	37 35	38 16	38 57	39 38	40 19	41 00
42	35 42	36 24	37 06	37 48	38 30	39 12	39 54	40 36	41 18	42 00
43	36 33	37 16	37 59	38 42	39 25	40 08	40 51	41 34	42 17	43 00
44	37 24	38 08	38 52	39 36	40 20	41 04	41 48	42 32	43 16	44 00
45	38 15	39 00	39 45	40 30	41 15	42 00	42 45	43 30	44 15	45 00
46	39 06	39 52	40 38	41 24	42 10	42 56	43 42	44 28	45 14	46 00
47	39 57	40 44	41 31	42 18	43 05	43 52	44 39	45 26	46 13	47 00
48	40 48	41 36	42 24	43 12	44 00	44 48	45 36	46 24	47 12	48 00
49	41 39	42 28	43 17	44 06	44 55	45 44	46 33	47 22	48 11	49 00
50	42 30	43 20	44 10	45 00	45 50	46 40	47 30	48 20	49 10	50 00
51	43 21	44 12	45 03	45 54	46 45	47 36	48 27	49 18	50 09	51 00
52	44 12	45 04	45 56	46 48	47 40	48 32	49 24	50 16	51 08	52 00
53	45 03	45 56	46 49	47 42	48 35	49 28	50 21	51 14	52 07	53 00
54	45 54	46 48	47 42	48 36	49 30	50 24	51 18	52 12	53 06	54 00
55	46 45	47 40	48 35	49 30	50 25	51 20	52 15	53 10	54 05	55 00
56	47 36	48 32	49 28	50 24	51 20	52 16	53 12	54 08	55 04	56 00
57	48 27	49 24	50 21	51 18	52 15	53 12	54 09	55 06	56 03	57 00
58	49 18	50 16	51 14	52 12	53 10	54 08	55 06	56 04	57 02	58 00
59	50 09	51 08	52 07	53 06	54 05	55 04	56 03	57 03	58 01	59 00
60	51 00	52 00	53 00	54 00	55 00	56 00	57 00	58 00	59 00	60 00

A
CATALOGUE *of a Thouſand of the fixed* Stars, *according to the accurate Obſervations of the late Treſ-noble Dane,* TYCHO BRAHE, *and by him rectified to the beginning of the Year of Mans Redemption* 1601.

And firſt of them which are placed in the *Zodiaque.*

ARIES; *The Ramme.*

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		M
THe ſouthern in the former Horn (cal'd the firſt ſtar ♈.)	27	37	♈	7	8	N	4
The northern following in the ſam horn	28	23	♈	8	29	N	4
The bright ſtar in the top of the Head	2	6	♉	9	57	N	3
The northern of the two in the Jaw	2	34	♉	7	23	N	6
The ✳ which is more towards the South	3	20	♉	5	42½	N	6
That in the hinder part of the Neck.	27	57	♈	5	24	N	5
In the Reins.	8	36	♉	6	7	N	6
In the eduction of the tail	12	57	♉	4	8½	N	5
The former of the three in the tail	15	15	♉	1	46½	N	4
The middle	16	27	♉	2	50	N	5
The laſt	17	50½	♉	2	36	N	6
In the thigh	11	22	♉	1	12	N	6
In the Hamme	9	35	♉	1	7	N	6
In the left Knee	9	23	♉	1	30	S	6
In the right Knee	7	52	♉	0	39	S	6
The little ſtar in the Belly	8	46	♉	4	1	N	6
Below the bright ſtar of the Head	1	41	♉	9	13	N	6
The former upon the back of the four without form	10	35	♉	10	50½	N	5
The following frõ them that follow at the Bſe of vveſt △	11	23	♉	11	16	N	4
The eaſtern in the baſe of the Triangle	12	40	♉	10	24	N	3
In the Crovvn of the ſaid △ tovvards the north	12	51	♉	12	25½	N	4

TAURUS; *The Bull.*

THe higheſt in the Section	18	0	♉	5	57	S	5
The follovving	17	30	♉	7	29	S	6
The third	16	18	♉	8	49½	S	4

The

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′	S	M ag
The fourth more South.	15	35½	♉	9	22½	S	4
In the right ſhoulder.	21	46	♉	8	41	S	4
In the Breaſt.	25	1	♉	8	3	S	4
In the right Knee.	27	59	♉	12	13½	S	4
In the right Hough.	24	19	♉	14	30½	S	4
In the left Knee.	4	9	♊	9	32	S	5
In the left Hough.	3	11	♊	11	48	S	5
In the face: the firſt of ſuc. in the noſtrils.	0	12	♊	5	46	S	3
Between this and the North eye.	1	16½	♊	4	2	S	3
Between the ſame and the South eye.	2	22	♊	5	53	S	4
In the South eye: *Aldebaran, Palilitium.*	4	12½	♊	5	31	S	1
In the North eye.	2	53	♊	2	36½	S	3
At the Root of the South Horn.	8	12	♊	3	40	S	6
The ſouthern of the ſecond in the ſame Horn.	12	13	♊	2	30	S	6
That more towards the North.	11	4	♊	1	49	S	4
In the extremity thereof.	19	12	♊	2	14	S	3
In the beginning of the North Horn.	6	35	♊	0	40	N	5
The northward of the 2 in the ear.	2	54	♊	1	4	N	5
That ſouthward.	2	38	♊	0	35	N	4
The former of the two in the neck.	27	51	♉	1	12	N	5
That which followeth.	0	28	♊	0	46½	S	6
The ſouthern in the hinder part of the neck.	0	4	♊	5	16	N	6
In the common extremity with the right foot of *Henio.*	16	59½	♊	5	20	N	2
The northern of the ſame ſide.	29	49½	♉	7	55	N	5
The ſouthern of the following ſide.	2	34	♊	3	57	N	5
The northern of this ſide. (*Pleiades.*	2	29	♊	5	45½	N	5
The brighter ✶ of the 3 towards the Weſt amongſt the	23	50	♉	4	11	N	5
The loweſt toward the Weſtern of them.	24	3	♉	4	2	N	6
The middle and brighteſt of them.	24	24	♉	4	0	N	3
That in the point towards the Eaſt.	24	47	♉	3	55	N	5
In the hoof of the left foot.	19	57	♉	13	30	S	6
The little ſtar in the ankle of the following foot.	0	10	♊	12	2	S	6
In the right ſhoulder.	1	58½	♊	8	41	S	5
The former of the three below *Sucula.*	2	42	♊	6	56½	S	5
The middlemoſt.	3	28	♊	7	4	S	5
The following.	4	55	♊	6	17½	S	5
The little ſtar in the South Horn.	15	2	♊	1	4	S	6
The following in the ſame Horn.	16	55½	♊	1	20	S	6
The little ſtar following the four in the ſection.	17	33	♉	9	34½	S	6
The preceding of the two in the □ of the neck.	29	22½	♉	6	33	N	5

GEMINI; *The Twins.*

3 24

IN the higher head, *Caſtor, Apollo.*	14	41	♋	10	2	N	2
In the lower head, *Pollux, Hercules.*	17	43	♋	6	38	N	2
In the left hand of the former Twin,	5	32	♋	10	58	N	5
In the left ſhoulder.	9	54	♋	7	43	N	4
In the ſhoulder blade of the ſame.	13	24	♋	5	42	N	4
In the right ſhoulder.	15	47	♋	5	10	N	5
In the left ſhoulder of the following Twin.	18	6	♋	3	3	N	4
In the right ſide of the former Twin.	13	18	♋	2	56	N	6
The little ſtar in the left elboe of the higher Twin.	14	10	♋	6	0	N	6
In the Northern and ſupream Knee.	4	22	♋	2	11½	N	3

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		*M* ag
In the left Knee of the following Twin	9	26	♋	2	6½	S	3
In the Belly of the ſouthern Twin	12	56	♋	0	13	S	3
In the Hamme of the lower Twin	13	13	♋	5	41	S	4
The firſt in the foot of the former Twin	27	58	♊	0	58	S	4
The following ſtar in the ſame foot call'd the Heel	29	44	♊	0	53	S	3
In the end of the right foot of the former twin	1	14	♋	0	8	S	4
The light ſtar of the foot	3	51	♋	6	48½	S	2
In the lower foot of the following twin	5	29½	♋	10	9	S	4
In the Heel of the ſame foot	7	56	♋	9	41	S	6
Above the Knee of the lower twin	6	23	♋	1	12	S	6
In the thigh of the higher twin	8	37	♋	1	31	N	6
Beneath the Head, lower in the hand	19	42	♋	5	44	N	6
The little ſtar between both Heads	17	4	♋	7	24	N	5
About the ear of the higher twin	13	29	♋	9	42	N	5
The former at the top of the foot πρόπους	25	22	♊	0	31	S	4
The loweſt of the five preceding between the twins	17	2½	♋	5	52	S	6
The following above the ſame	18	6	♋	3	48½	S	6
The third	19	30½	♋	2	42	S	6
The fourth	12	28	♋	0	57½	S	6
The laſt	23	54	♋	1	18½	N	6

CANCER *A Crab-fiſh.*

THe Cloud in the Breaſt, called *Preſepe*	1	46½	♌	1	14	N	*clo*
The northern of them that precede in □ of ♋	29	49	♋	1	31½	N	5
The more South	0	9½	♌	0	47½	S	5
The North *Aſellus*	1	57	♌	3	8	N	4
The South *Aſellus.*	3	8	♌	0	4	N	4
In the South Arm	8	3½	♌	5	8	S	3
In the North Arm	0	44	♌	10	23	N	5
In the extremity of the North-Foot	23	56	♋	1	15½	N	5
In the extremity of the South-Foot	25	4	♋	7	5	S	5
The lighter in the root of the tail	25	45½	♋	2	18½	S	4
The next following in the Back	28	12½	♋	1	4	S	6
The northern of the three in the South arm	6	47½	♌	1	54	S	6
The Southern in the ſame arm	10	36	♌	5	36	S	5
The Northern of the two in the Back	5	27	♌	7	14	N	6
The lower towards the South	7	36½	♌	5	20	N	6

LEO, *The Lion.*

IN the Noſtril	9	41½	♌	10	23	N	4
In the opening of the mouth	12	16½	♌	7	52	N	4
The more northern of the two in the Head	15	51	♌	12	21	N	4
The ſouthern	15	5	♌	9	40	N	3
The northern of the three in the neck.	21	57½	♌	11	50	N	3
The middle and brighteſt ſtar of the neck	23	59	♌	8	47	N	2
That towards the South	22	20	♌	4	52	N	3
The Heart : *Regulus* βασιλισκος	24	17	♌	0	26	N	1
The ſouthern in the Breaſt.	24	50½	♌	1	25	S	5
That going before next *Regulus*	21	43½	♌	0	0	N	4
That precedeth this in the right Knee	17	54½	♌	0	16	N	5

In

Denomination of the Stars.	*Longitude*			*Latitude*			
	D	′	S	D	′		*M* ag
In drace dextra	16	7	♌	3	10	S	4
The following ſtar in the other foot	18	40	♌	3	47	S	4
In drace ſiniſtra	23	46	♌	3	55	S	4
In the left arm-hole	0	48	♍	0	8	[illegible]	4
The firſt of the three in the belly	22	24	♌	2	10	N	6
That more North of them that follow	2	6	♍	5	56	N	6
The more ſouthern	4	5	♍	2	49	N	6
The former of the two in the Loyns	3	14	♍	12	53	N	5
The light ſtar which followeth	5	41	♍	14	20	N	2
The northern and preceding of the two in the Buttock	7	50	♍	9	41½	N	3
The following and ſouthern ſtar	9	8	♍	7	50½	N	6
In the Thigh	11	58½	♍	6	7	N	3
In the latter Knee	13	8½	♍	1	40	N	4
The middle ſtar in the foot	15	57	♍	0	33	S	4
The loweſt ſtar in the foot	19	27	♍	3	2½	S	4
In the extream of the light tail	16	3	♍	12	18	N	1
The extream ſtar in the Hoof of the left foot	16	32	♌	4	48	S	6
In the Hoof of the other foot preceding	16	1½	♌	5	43	S	5
That almoſt in the mid-body	0	14	♍	10	17	N	6
A little ſtar in the Head	16	13	♌	10	47½	N	6
The firſt of the two in the latter left foot	15	53½	♍	7	39	S	4
That following	18	50	♍	5	41	S	5
The preceding of the two without ſhape on the Back	26	22½	♌	17	40	N	5
That following	29	57	♌	16	30	N	5
That above the light ſtar in the Back	4	54½	♍	16	47	N	5
Above the tail of ♌, or rather in the right hand of ♍.	13	22	♍	17	19	N	4
The northern of the three under the belly	8	58	♍	1	20½	N	4
The middlemoſt	8	30	♍	0	9½	S	5
The ſouthern of the three	9	20	♍	2	29	S	5

VIRGO; *The Virgine.*

THe northern of thoſe that go before in □ of the Head	17	44	♍	6	6½	N	5
The ſouthern	18	33	♍	4	37	N	5
The northern of the two following ſtars *in vultu.*	22	7	♍	8	33½	N	5
The ſouthern	21	58	♍	6	10	N	5
In the end of the South and left Wing	21	32	♍	0	43	N	3
The former of the four in the ſouth Wing	29	16	♍	1	25	N	4
The other following	4	35	♎	2	50	N	3
A little ſtar, the laſt but one	9	28	♎	2	23½	N	6
The laſt	12	37	♎	1	45	N	4
In the right ſide under the Girdle	5	55	♎	8	41	N	3
The preceding of the 3 in the right and northern Wing	29	53	♍	13	36½	N	5
The ſouthern of the two other	1	52	♎	11	37	N	6
The more northern, called *Vindemiatrix*	4	23	♎	16	15½	N	3
In the left hand. *Spica*	18	16	♎	1	59	S	1
Under the Breech in the right Buttock	15	22	♎	8	10	N	3
The northermoſt in the left hand	17	58	♎	3	11	N	6
The more northern of the two following	21	9	♎	1	45½	N	6
The more ſouthern	19	44	♎	0	19½	S	6
In the left knee	24	44	♎	2	24½	N	6
The northern of the two in the higher skirt	27	49	♎	11	2	N	5
The middle of the three in the skirt	28	9	♎	7	18½	N	4

Denomination of the Stars.	*Longitude*			*Latitude*			*M*
	D	′	S	D	′		
The loweſt and ſouthern	28	51	♎	2	57	N	4
The more ſouthern of the two in the higher skirt	29	51	♎	11	48½	N	4
In the Sonth foot	1	22	♏	0	31½	N	4
In the Northern and right foot	4	30	♏	9	49	N	4
The lower of the two between *Vin:* and the Girdle	1	21	♎	10	26	N	6
The ſtar following the ſame in the right buttock	21	37	♎	9	40½	N	6
In the hinder part of the neck	27	45	♏	4	59½	N	6
The little ſtar following *Vindemiatrix*	8	25	♎	16	14	N	6
The firſt of the three in the right line of the North Wing	10	11	♎	12	40	N	5
The middle of them	14	46	♎	12	34½	N	6
The following	22	11	♎	13	7	N	5
That which is between the fourth and the fifth	22	56½	♍	3	32½	N	6
That without form under the left arm, &c.	6	38	♎	3	25½	S	5
The middle	10	39	♎	3	23	S	5
The following	14	8½	♎	3	13½	S	5
The former of the three under the ♍ ſpick	17	13	♎	7	51	S	5
The middlemoſt towards the South	19	35	♎	9	16	S	5
The ſtar following more Eaſt	20	35½	♎	6	16½	S	5

LIBRA; *The Ballance.*

THe South Ballance	9	31	♏	0	26	N	2
That above the South Ballance	8	42	♏	1	55	N	5
The North Ballance	13	48	♏	8	35	N	2
That above the North Ballance towards the Weſt	9	40½	♏	8	18½	N	4
The firſt from the South Ballance towards the Eaſt	12	26½	♏	1	24	N	5
The ſecond from the ſaid Ballance towards the Eaſt	16	19	♏	2	58½	N	6
The third from the ſaid Ballance towards the Eaſt	19	33	♏	4	28	N	3
That below this towards the Eaſt	21	48½	♏	4	4	N	4
That below the ſame towards the Weſt	19	27	♏	2	21	N	4
The ſtar below the North Ballance to the Eaſt	15	46	♏	8	7	N	4
The higher of the two ſtars below the South Ballance	24	11	♏	0	2½	N	4
The lower of the ſame	25	3½	♏	0	7	N	4
After this, the preceding of the three in a right line	24	16	♏	3	33	N	4
The middle	24	48	♏	6	10	N	4
The higher and more Eaſtern	25	41½	♏	9	19	N	4
That which followeth	27	19	♏	10	57	N	5
In the left Arm under the North Ballance	15	8	♏	7	37	S	3
That following it.	15	27	♏	1	48	S	3

SCORPIO; *The Scorpion.*

THe higheſt in the forehead	27	36	♏	1	5	N	3
The middle in the forehead	26	59	♏	1	54½	S	3
The Southern of the 3 lighter ſtars in the forehead	27	25	♏	5	22½	S	3
That more towards the South in the foot	27	43½	♏	8	27½	S	4
The Northermoſt ſtar of the forehead	29	3½	♏	1	42	N	4
The little ſtar in △ with the light ſtar of the forehead	28	7	♏	0	14	N	5
That preceeding the heart towards the North	2	11	♐	3	55	S	4
The glittering ſtar in the middle, the Heart *Antares*	4	13	♐	4	27	S	1
The ſtar following the heart towards the South	5	53	♐	5	50	S	4
Amongſt the preceding lower feet	0	46½	♐	6	37½	S	5

SAGITARIUS

SAGITARIUS; *The Archer.*

Denomination of the Stars.	*Longitude*			*Latitude*			*M*
	D	′	S	D	′		
THe more South of the 2 in theNorth part of the Bow	0	47½	♑	2	0	S	4
That more North in the ſame part of the Bow	27	41	♐	2	27½	N	4
In the left ſhoulder	6	51	♑	3	31	S	4
The ſtar going before this in the Dart or Arrow	4	40	♑	3	50	S	5
The former of the three in the Head	7	56½	♑	1	24½	N	4
The middle	9	28	♑	0	59	N	4
The laſt	10	43	♑	1	31	N	4
The firſt in the Contact	12	44	♑	3	6½	N	6
The middle in the North Contact	13	54½	♑	4	17	N	4
The following and higher	14	11	♑	6	9½	N	5
The more Eaſtern ſubjoyned to two obſcure ſtars in form (of a △	19	8½	♑	5	8	N	6
The Eaſtern and laſt in the higher Contact	22	52½	♑	5	12	N	6
The obſcure ſtar in the lower Contact to the Eaſt	19	24	♑	1	25	N	6
The obſcure ſtar in the right Elboe	16	26	♑	3	8	S	6

CAPRICORNUS; *The Hee-Goat.*

Denomination of the Stars.	*Longitude*			*Latitude*			*M*
	D	′	S	D	′		
THe northern of the three in the former Horn	28	18	♑	7	2½	N	3
The middle	28	51	♑	6	53	N	6
The ſouthern	28	31	♑	4	41	N	3
The cloudy ſtar above the former Horn	27	8	♑	7	16	N	6
The cloudy ſtar of the Baſe of △ in the front	28	57	♑	0	48½	N	*clo*
The cloudy ſtar Eaſtern	29	41	♑	0	28	N	*clo*
The higheſt in the ſame △	29	37	♑	1	20	N	6
The cloudy ſtar preceding in the front	27	13	♑	0	24	N	*clo*
The northern of the two in the neck	2	49	♒	3	25	N	6
The Southern	2	6	♒	0	15	N	6
The obſcure ſtar preceding in the right knee	1	47	♒	6	58	S	6
The following ſtar in the left knee	2	28	♒	9	2	S	6
In the left Arm.	6	13	♒	8	8	S	6
The loweſt in the Belly	11	24½	♒	6	56	S	5
The Northern following ſtar of the 2 neer together under (the Paunch	12	0	♒	6	29	S	6
More Eaſtern of the three in the mid-belly	9	23	♒	4	25	S	6
The loweſt of them	7	31	♒	4	27	S	6
The northern of the three	7	18	♒	3	1	S	5
The former of the two in the Back	8	21	♒	0	29	S	5
The following ſtar of them in the Back	12	7	♒	1	16½	S	5
The preceding of the two towards the Flanck	14	25	♒	4	48	S	4
That following	16	6	♒	4	49	S	5
The firſt of the two bright ſtars in the tail	16	14	♒	2	26	S	3
That ſucceeding	18	0	♒	2	29	S	3
The former in the higher tail	18	14	♒	2	22	N	5
The more ſouthern of the reſt in the higher tail	20	27	♒	0	14½	S	5
The ſtar going before this towards the North	20	16	♒	0	10	S	6
The northern in the end of the tail	19	54	♒	4	17	N	6

AQUARIUS; *The Water-bearer.*

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		M
In the head	22	26½	♒	15	23	N	6
The brighter ſtar in the right ſhoulder	27	49½	♒	10	42	N	3
The more obſcure ſtar more Southward	26	36	♒	9	11	N	5
In the left ſhoulder	17	49	♒	8	42	N	3
In the Back under the arm-hole	18	38	♒	6	0	N	5
The following and lower of the three in the left hand	18	51	♒	4	50	N	5
The middlemoſt	7	28½	♒	8	19	N	5
The brighter ſtar going before	6	12	♒	8	10	N	4
In the right elboe	1	10	♓	8	17	N	3
That more North in the right hand	3	4½	♓	10	31	N	5
The former of the other two ſouthern ſtars	3	23	♓	8	52	N	4
That following	4	53	♓	8	10	N	4
The former of the two in the right hand *Cap.*	27	45	♒	2	46	N	4
The following of them	28	31	♒	2	29	N	6
In the right thigh	29	53	♒	1	10	S	5
That at the Buttocks	23	13	♒	2	0	S	4
The ſouthern ſtar in the right ſhank ſheat	3	22	♓	8	10	S	3
The northern, or ſtar at the knee	3	5	♓	5	46	S	5
In the left Hip	29	40	♒	5	40	S	6
The more ſouthern of the two in the left knee	26	55½	♒	10	48	S	5
The more northern	29	50	♒	9	57	S	6
In the pouring out of the water	3	52	♓	4	8	S	4
The ſucceeding South	6	4	♓	0	19	S	4
The following ſtar in the firſt bending of the water	9	0	♓	1	24	S	6
The other which accompanieth the ſame	11	38	♓	1	0	S	5
In the other South bending	11	33	♓	2	49	S	5
The former and more North of the two following	10	43	♓	3	58	S	5
The following more South	11	11	♓	4	10	S	5
Neer this declining towards the South	11	14½	♓	4	44	S	5
The preceding of the two neer together	14	7	♓	10	59	S	5
The following of them	14	38	♓	11	33	S	5
The Northern of the 3 in the 3^d bending of the water	13	3	♓	14	29	S	5
The middle ſtar in the third bending of the water	13	46	♓	15	16	S	6
The following and ſouthern of the three	14	44	♓	16	23	S	6
The northern of the three following ſtars	7	54½	♓	14	45	S	5
The middlemoſt of the ſame three	8	21	♓	15	30	S	5
The ſouthern of theſe three	9	50	♓	16	31	S	5
The higher of the three ſtars in the laſt bending	4	25	♓	14	25	S	5
The middlemoſt	4	2	♓	15	40	S	5
The loweſt next *Fomahant*	3	17	♓	15	53	S	5
The laſt in the effuſion *Fomahant*	28	11½	♓	21	0	S	1

PISCES; *Fiſhes.*

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		M
In the mouth of the ſouth Fiſh	13	2	♓	9	4	N	5
The ſouthern of the 2, in the hinder part of the head	15	50½	♓	7	17½	N	4
The northern in the hinder part of the head	17	30½	♓	8	54½	N	6
The former of the 2 in the Back	19	42	♓	9	3	N	5
The following ſtar in the Back	21	56½	♓	7	13	N	5

That

Denomination of the Stars.	Longitude D	′	S	Latitude D	′	S	M
That which goeth before in the Paunch	17	21	♓	4	23	N	5
That which followeth in the Paunch	21	5	♓	3	35	N	5
In the tail	27	2	♓	6	23	N	5
Above this towards the Eaſt	28	27	♓	7	27	N	6
The following *	2	29	♈	5	28	N	6
The preceding of the three lighter in the ſouth line	8	36	♈	2	11	N	4
The middlemoſt of them	11	58	♈	1	5	N	4
The following	14	19	♈	0	57	N	4
The northern going before of the ſecond ſmall * in the (bending of the net	12	25	♈	1	31	S	6
The following of them towards the ſouth	13	46	♈	4	19	S	6
The former of the 3 after the bending	17	33	♈	3	3	S	5
The middle	19	56	♈	4	40	S	5
The following and laſt	21	57½	♈	7	56	S	5
The brighter in the joyning together of both nets	23	47	♈	9	4	S	3
The former in the north line from the knot	22	12	♈	1	38	N	5
After this the ſouthern of the three	21	16	♈	1	51	N	5
The middle and brighter in the north knot	21	16	♈	5	21	N	4
The northern of the three, and the laſt in the net	21	36½	♈	9	24	N	5
The northern of the 2, in the mouth of the north Fiſh	23	15	♈	22	0	N	6
The ſouthern	22	49½	♈	20	43	N	5
The northern in the head of the triangle	19	22½	♈	20	55	N	6
The ſouthern of the ſame triangle	18	6½	♈	19	24	N	6
The middle and formoſt * of the triangle	17	3½	♈	20	24	N	6
The preceding of the 3, in the ſouth throat neer the elbow (of *Andromeda*	17	56	♈	13	21	N	5
The middlemoſt	18	2½	♈	20	21	N	6
The loweſt of the three	18	9	♈	11	21	N	6
The northern of the 2 in the Belly	3	18	♈	17	26	N	5
That more toward the ſouth	20	58	♈	15	30	N	5
That following the middle of the 3 in the ſouth	19	0	♈	12	27	N	5
That following the northern * in the belly to the north	4	11	♈	18	31	N	6
In the hinder part of the head of the north Fiſh	21	41	♈	23	3	N	6

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The Second Part of the Catalogue, conteining the Northern Images of the fixed Stars.

CYNOSURA; *or the leſſer Bear.*

IN the end of the tail *Vulgò Polaris*	23	2½	♊	66	2	N	2
The laſt ſtar of the tail but one	25	36	♊	69	50	N	4
The ſtar in the root of the tail	3	24	♋	73	50	N	4
The higher of the 2 in □ of them that follow	21	29	♋	75	6	N	4
The lower of the ſame	24	52	♋	77	38½	N	5
The higher of the two in □ of them that precede.	7	16½	♌	72	51	N	2
The lower of the ſame.	14	41	♌	75	23	N	3
The informed of the two South at the head of the Bear.	2	54	♌	71	23	N	6
That placed above the ſame.	27	20½	♋	70	18	N	6

The

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		M
The firſt of thoſe without form which are in a right line (with the Pole	17	17	♊	35	50	N	6
The ſecond of them	17	28	♊	37	20	N	6
The third, (being and obſcure ✳)	17	45	♊	40	13	N	6
The fourth	18	3	♊	42	56	N	6
The firſt of them without form about the Pole	21	38	♋	57	55	N	6
The ſecond of them	21	55	♊	70	42	N	6
The third	24	31	♊	69	8	N	6
The fourth	15	7	♊	88	4	N	6
The fifth	7	22	♊	67	43	N	6
The ſixth	9	57	♊	67	22	N	6
That neereſt the Pole	26	30	♊	63	55	N	6

HELICE; *The Greater Beare.*

That in the Snowt	17	36½	♋	40	2	N	4
Under the left Eye	17	10	♋	43	55	N	4
That very neer under this	6	8	♋	44	22	N	5
Above the right Eye	18	25	♋	47	50	N	4
Above the left Eye	19	44	♋	47	44	N	4
Neer the left Eare	24	42	♋	51	36	N	5
The loweſt and former in the little △ of the Neck	23	50	♋	42	30	N	5
That following in the ſame △	25	2	♋	45	3	N	4
The higheſt in the top of the ſaid △	28	00	♋	46	21	N	5
In the Neck, ſucceeding the ſaid Triangle	00	38	♌	42	36	N	4
The following ✳ below this	3	38½	♌	38	15	N	4
In the left Knee going before	00	32½	♌	34	34	N	3
The more northern of the 2 in the right Foot	25	56	♋	29	15	N	3
The more ſouthern	27	10	♋	28	38	N	3
Below the right Knee	27	7	♋	33	30	N	5
In the right Knee	27	26	♋	36	6	N	5
The higher of them that goe before in the greater □	9	34	♌	49	40	N	2
The lower of the ſame □	13	43½	♌	45	3	N	2
The higher of thoſe following □	25	25½	♌	51	37	N	2
The lower of them	24	45	♌	47	6	N	2
The higher of the latter ✳ of the left Foot	13	56	♌	29	51	N	4
The following and more ſouthern ✳	15	4½	♌	28	45	N	4
In the preceding Knee of the hinder Feet	22	33	♌	35	14	N	4
The former of the 2 ✳ following in the right Foot	00	55	♍	26	14	N	4
The following and more ſouthern	1	36	♍	24	54	N	4
The laſt but 2 of the Taile	3	10	♍	54	18	N	2
The laſt but one of the Taile	9	56½	♍	56	22	N	2
The laſt of the Taile	21	12	♍	54	25	N	2
That without ſhape between the Taile of this, & the Lion	17	43	♍	40	6	N	2
That in the Buttocke	28	10	♌	41	30	N	4
In the left Foot behinde	21	2	♌	33	1	N	5
That without form between the Bear and the Lions Head	6	17	♌	17	55	N	3
The ✳ above this towards the Eaſt	8	10	♌	20	42	N	4
The ✳ that goeth before this	5	00	♌	20	5	N	4
The following of the 2 before theſe	1	57	♌	20	51	N	4
The former of them	29	42	♋	23	41	N	4
Between the extream Foot and the Head of the Lion	6	17	♌	17	55	N	4
The north ✳ followng	18	55	♌	25	4	N	4
The ſouth ✳ following	19	57	♌	24	59	N	5

The

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		M
The former of the two in the Baſe of the *Oxygonium*	23	22	♌	21	28	N	3
That following	26	9	♌	20	44	N	3
The third northern ſtar in the *Oxygonium*	25	19	♌	24	58	N	4
That between the legs of the Bear	12	16	♍	40	30	N	5
The firſt between the tail and the body	21	29	♋	58	8	N	6
The ſecond	23	55	♋	47	14	N	6
The third	19	49	♋	47	30	N	6
The firſt between the Bear and the Lions Head	23	17	♋	46	50	N	6
The ſecond	3	58	♌	47	55	N	6
The third	6	0	♍	48	40	N	6
The fourth	6	30	♍	49	42	N	6
The fifth	6	19	♍	49	42	N	6
The ſixth	19	5	♍	49	0	N	6
The ſeventh	18	1	♍	49	27	N	6
The eighth	25	42	♍	48	11	N	6
The ninth	16	2	♍	52	25	N	6
The little ſtar that toucheth the Hip	1	41	♌	35	40	N	6

The Dragon.

That in the tongue	18	56½	♏	76	17	N	4
In the mouth	4	14½	♐	78	15	N	4
The former of the two bright ſtars in the Head	6	19	♐	75	21½	N	3
That neer the eye lid	19	3	♐	80	21	N	4
The following of the bright ſtar, *vulgò lucida capitis*	22	24	♐	75	3½	N	3
The more northern of the three in the firſt inflexion of (the neck	17	4	♑	81	53	N	5
The ſouthern	24	31	♑	77	57	N	5
The middle of them	20	33	♑	79	51½	N	5
That following towards the Eaſt	9	29	♒	80	53	N	4
That neer the ſecond flexure	28	32½	♓	81	51	N	4
The northern of the ſecond flexure of the □	12	26	♈	82	49	N	3
The northern of the followieg ſide	15	21	♈	78	9	N	4
The ſouthern of the ſame ſide	27	47	♈	79	25	N	3
The former ſtar of the following Triangle	15	18	♉	83	5	N	4
That following towards the eouth	19	40	♉	80	38	N	4
That above it	26	44	♈	80	54	N	4
The following ſtar in the other Triangle	6	34	♋	83	4	N	4
The ſouthern thereof	1	28	♋	83	28	N	4
The former and northern ſtar of the Triangle	5	31	♊	84	48	N	4
That in the flexure of the third joynt, or knot	29	44	♌	81	4	N	3
The neereſt to the Pole of the Zodiack	6	26	♌	86	53	N	4
Which follows the 24	28	21	♍	83	18	N	5
Succeeding this	28	22	♍	81	41	N	3
The neerer to the Pole indifferently light	26	51½	♍	84	46	N	3
Preceding the laſt but three from the extream flexion	7	55	♎	78	32	N	3
The laſt but two going before the flexion	12	28½	♎	74	11½	N	3
The laſt but one going before the flexion	29	22	♍	71	4	N	3
The ſecond, which followeth the flexion	29	17	♌	65	18	N	5
Which followeth next after the flexion	2	10½	♍	66	36	N	2
The laſt ſtar ſave one of the tail	10	26⅒	♌	61	33	N	3
The laſt ſtar of the tail	4	37½	♌	57	7	N	3
Between 11 and the arm of *Cepheus* : *inform.* ✳.	1	4	♈	77	31½	N	5

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		*M*

CEPHEUS.

IN the Girdle	0	13	♉	71	7	N	3
The clear ſtar in the right ſhoulder	7	13	♈	68	54	N	3
In the left ſhoulder	27	53½	♈	62	35	N	4
That in the hood towards the North	8	29	♈	61	3	N	4
The ſouthern	7	53½	♈	59	59	N	4
That towards the Eaſt	13	39	♈	58	46	N	4
The ſouthern of the two in the bending of the Arm	29	21	♓	71	49	N	4
The northern	29	54	♓	74	0	N	4
That in the ſhoulders	18	46	♈	65	42	N	5
In the right foot	27	33	♉	75	27	N	4
In the left foot	24	23	♉	64	28	N	3

BOOTES ARCTOPHYLAX.

THe former of three in the left hand	24	9½	♍	58	53	N	4
The ſecond	25	33	♍	58	51	N	4
The third	26	59½	♍	60	5	N	4
In the left elbow	1	18	♎	54	40	N	4
In the left ſhoulder	13	5½	♎	49	33½	N	3
In the Head	18	43½	♎	54	15½	N	3
In the right ſhoulder above the Crown	27	29½	♎	49	1	N	3
Below the right arm in the hip	22	29	♎	40	40	N	3
The lower of the two in the Back	18	16	♎	42	11	N	4
The higher of them	17	17½	♎	42	35	N	4
That in the right leg	27	26½	♎	27	57	N	3
The higheſt in the left leg	13	42	♎	28	9	N	3
The middle	12	25	♎	26	33	N	4
The loweſt	13	37	♎	25	13	N	4
In the skirt of his garment, *Arcturus*	18	39	♎	31	2½	N	1
The loweſt of the 3 without form about the right Knee	26	13½	♎	30	27½	N	4
The middle	27	11	♎	31	22	N	4
The higheſt	27	52	♎	33	52	N	4
The former of the four in the right hand	28	11	♎	40	14	N	5
That following South	29	40	♎	40	31	N	5
The northern	27	53	♎	42	16	N	5
The ſtar following this	29	16	♎	41	55	N	6
The former of the two ſouthern *in colorobo*	29	34½	♎	45	6	N	5
The following	1	26	♎	46	52	N	5
The higher *in colorobo*	27	34	♎	53	27½	N	4
That without form following this	2	36	♍	54	0	N	4
The firſt of the two without form about the head	11	49	♎	60	40	N	0
The ſecond of them	12	33	♎	60	57	N	6

CORONA BOREA; *The North Crown.*

THe bright ſtar of the Crown	6	38½	♏	44	23	N	2
That going before	3	37	♏	46	8	N	4
The ſtar above this	3	10½	♏	48	25	N	5

Denomination of the Stars.	Longitude D	′	S	Latitude D	′		M
That which followeth to the north	8	2	♏	50	21	N	6
That following the bright ✳	9	14½	♏	44	33	N	4
The next following	11	25	♏	44	52	N	4
The next which doth accompany it	13	32	♏	46	9½	N	4
The laſt of all	13	2	♏	48	24	N	6

HERCULES.

IN the Head	10	31	♐	37	23	N	3
In the right ſhoulder	25	27½	♏	42	48	N	3
The laſt but one of the right Arme	23	36	♏	40	5½	N	3
The loweſt in the Arme	20	6½	♏	37	19	N	4
In the left ſhoulder	9	10	♐	47	47	N	3
In the left Arme	14	22	♐	49	23	N	4
The former in the ſhin of the Lion	19	36	♐	51	16½	N	4
The following in the △ of the skin	27	19	♐	52	19	N	4
In the Baſe of the triangle towards the north	23	57	♐	53	46	N	4
The middle of them in the skin	23	38	♐	52	47	N	4
In the left hip	26	2	♏	53	10½	N	3
The more orientall in the left thigh	2	45½	♐	53	21	N	3
The former of the 3 neer together in the thigh	6	21	♐	59	38	N	4
The middlemoſt	7	19	♐	60	11½	N	4
The following ✳	9	47½	♐	60	13	N	4
In the left Knee	22	56	♐	60	47½	N	3
That in the calfe of the left legge neer the Dragons Head	14	17	♐	69	22	N	3
The former of the 3 obſcure ſtars in the left foot	7	5½	♐	71	20	N	6
The middle of them	11	7	♐	71	13½	N	6
The laſt	18	0	♐	71	5	N	clo
In the higher right thigh	23	8½	♏	60	22	N	3
The more northern in the ſame thigh	17	39½	♏	63	14	N	4
In the right Knee	8	43	♏	65	55	N	4
In the higher calfe of the legge	5	57	♏	63	51	N	4
In the legge	2	43	♏	64	23	N	5
The former in the right legge	16	32	♏	62	29	N	4
In the legge of the right foot about the Ankle	2	28½	♏	60	15½	N	4
That almoſt in the mid-body	27	6	♎	57	15	N	4

The Harp.

THe bright ſtar of the Harp	9	43	♑	61	47	N	1
That above the bright ſtar towards the north	13	14	♑	62	27	N	5
That under the bright ſtar towards the eaſt	12	26	♑	60	26	N	5
That in the middle of the going out of the horns	16	10½	♑	59	26	N	4
The northern of the two ſtars neer upon touching	24	32½	♑	60	46	N	5
That to the South	25	2	♑	59	41	N	5
The northern of the two preceding in the north yoke	11	16½	♑	56	5	N	3
The little ſtar under this	13	3½	♑	55	16	N	6
The northern of the two following in the yoke	16	11	♑	55	6	N	3
The little ſtar under it	16	20	♑	54	31½	N	6
That almoſt in the mid-body	20	52	♑	58	6	N	5

The Swan.

Denomination of the Stars.	*Longitude*			*Latitude*			*M*
	D	′	S	D	′		
IN the Bill	25	44	♑	49	2	N	3
In the Head	29	20	♑	50	42	N	5
In the middle of the neck	7	33	♒	54	19	N	4
In the breaſt	19	25	♒	57	9½	N	3
In the tail	29	53½	♒	59	56	N	2
The firſt and brighteſt in the bowing of the higher Wing	10	53	♒	64	28	N	3
The ſouthern of the three in the higher Wing	13	21	♒	69	42	N	4
The laſt but one of the higher Wing	12	39½	♒	71	31	N	4
The extream ſtar of the higher Wing	9	36	♒	73	50½	N	4
That in the bending of the lower Wing	22	9½	♒	49	26	N	3
In the middle thereof	24	18	♒	51	41½	N	4
The extream ſtar of the lower Wing	27	43	♒	43	44	N	3
The former ſtar in the lower foot	0	32	♓	54	59	N	4
That following in the lower Knee	5	21	♓	56	36	N	4
The ſouthern and former of the two neer together in the	22	50	♒	63	37	N	4
The higher of them (higher foot	24	34	♒	64	17	N	4
The lower of the two without form following the right	3	3	♓	50	33	N	4
The higher of them (Wing	4	53	♓	51	31	N	4
Below the Wing towards the foot of *Pegaſus*	4	33	♓	38	39	N	4
The former of the two towards the Harp	19	57	♑	66	15	N	4
The more northern following	24	49	♑	68	52	N	4
The little ſtar at the middle of the Wing	28	41	♒	69	35	N	6
Neer the lower Wing	18	14	♒	53	12	N	6
Towards the higher	13	18	♒	69	42	N	6
The new ſtar of the year 1600, in the Breaſt of the Swan	16	15	♒	55	30	N	

CASSIOPEIA.

Denomination of the Stars.	*Longitude*			*Latitude*			*M*
IN the Head	29	35	♈	44	40	N	4
In the Breaſt, *Schedir*	2	17½	♉	46	35	N	3
In the Girdle	4	38½	♉	47	5	N	4
In the bowing towards the Hips	8	27½	♉	48	46	N	3
At the Knee	12	21	♉	46	22	N	3
In the Leg	19	13½	♉	47	29	N	3
The extream ſtar of the foot	26	39	♉	48	54	N	4
In the left Arm	6	14½	♉	43	6½	N	4
In the left Elbow	5	16	♉	43	28	N	5
In the right Elbow	24	39	♈	49	24	N	6
In the eduction of the Seat	7	6	♉	52	16	N	4
The bright ſtar of the Chair	29	35½	♈	51	14	N	3
The extream ſtar of the Chair	25	34	♈	51	8	N	6
Which is by this towards the extremity of the cell	25	32	♈	52	39	N	6
That almoſt in a right line with the 11 and 17	19	28	♉	52	48	N	6
The end of the foot-ſtool	22	21	♉	56	13	N	6
The middle of the foot-ſtool	22	23	♈	54	27	N	6
In the foot-ſtool next to the Plant of the foot	21	58	♉	52	8	N	6
That which followeth the Knee	12	57	♉	44	57	N	6
That going before the Knee	10	0	♉	45	4	N	6
The Navell ring	6	52	♉	47	31	N	6

Denomination of the Stars.	*Longitude*			*Latitude*			
	D	′	S	D	′		*M*
The little ſtar in the lair	29	10	♈	45	38	N	6
The northern of the two following in the Rod	29	32	♈	41	15	N	6
The former of them	27	57	♈	41	25	N	6
The laſt but one of the Rod	26	56	♈	39	15½	N	6
The end of the Rod	25	54	♈	38	9	N	6
The preceding of the three no. below the foot-ſtool	1	46	♊	53	16	N	6
The following ſtar north	6	12	♊	53	32	N	6
The ſouthern	0	11	♊	52	4	N	6
Above this to the north	6	45	♊	59	8	N	6
Between *Caſſiopeia* and *Erichton*						N	
The firſt	17	17	♊	35	50	N	6
The ſecond	27	19	♊	35	48	N	6
The third	2	33	♋	34	49	N	6
The fourth	3	0	♋	30	22	N	6
The firſt of the three towards the north	0	45	♋	44	10	N	6
The ſecond	0	57	♋	45	32	N	6
The third	26	15	♊	45	32	N	6
The firſt ſtar more north towards the leſſer Bear	0	10	♋	54	43	N	6
The ſecond	27	45	♊	56	15	N	6
The third	4	13	♋	56	55	N	6
The fourth	29	58	♊	59	18	N	6
The fifth	7	54	♋	60	47	N	6
The ſixth	10	14	♋	62	4	N	6
The ſeventh	9	37	♋	62	46	N	6
The eighth	20	58	♋	63	17	N	6
The new ſtar of the year 1572	6	54	♉	53	45	N	6

PERSEUS.

In the utmoſt folding of the right hand	18	31	♉	39	0½	N	6
In the right elbow	23	9½	♉	37	28	N	4
In the right ſhoulder	24	46	♉	34	30	N	3
In the left ſhoulder	19	4½	♉	31	34½	N	4
In the crown of the head	21	50	♉	34	26	N	5
In the back	23	33	♉	30	36	N	4
The ſhining ſtar in the right ſide	26	17	♉	30	5	N	2
That which follows next below	27	4½	♉	27	59	N	5
The little ſtar following this	28	13½	♉	27	55	N	5
Neer the bowing of the ſame ſide	29	15	♉	27	14	N	3
That in the left elbow	22	6	♉	26	4	N	4
The head of *Meduſa*, *Algol*	20	37	♉	22	22½	N	3
That under *Algol*	20	31	♉	20	54	N	5
That going before this	19	18	♉	20	33	N	4
That preceding towards the north in the ſame head	18	20	♉	21	35	N	4
In the right hamme	6	13½	♊	28	22	N	5
That that goeth before the right knee	4	11½	♊	28	50	N	4
That going before the bending of the knee	3	55	♊	26	11	N	4
The middle ſtar in the right knee	5	14	♊	26	39	N	4
That below the right knee	6	0	♊	24	35	N	6
In the plant of the right foot	8	1	♊	18	56	N	5
In the left thigh	28	11	♉	22	6	N	4
In the left knee	0	8	♊	19	4	N	3
In the left leg	29	23½	♉	14	53½	N	5

In

Denomination of the Stars.	*Longitude*			*Latitude*			
	D	′	S	D	′		*M*
In the left heel	25	33	♉	12	8	N	4
That followeth the left foot	27	36	♉	11	17	N	4
Without form above the head	26	45	♉	42	26	N	3
That in the higher part of the right thigh	2	32	♊	29	31	N	5
That without form going before the head of *Med.*	16	16	♉	20	53	N	5
That which maketh a ſtreight line with the Pole and the bright ſtar of *Perſeus*	2	18	♊	45	10	N	4
The ſecond of them	4	12	♊	48	7	N	6
The third	4	41	♊	49	27	N	6
The fourth	6	25	♊	53	37	N	6

ERICHTONIUS AURIGA.

The higher and former of the two ſtars in the head	23	38	♊	32	15	N	6
The lower, and following ſtar	24	14	♊	30	50	N	4
The gliſtring ſtar in the left ſhoulder, the Goat	16	16	♊	22	50½	N	1
The bright ſtar in the right ſhoulder	25	52	♊	21	27½	N	2
In the right arm	24	28	♊	13	44	N	4
In the left elbow	13	9	♊	20	52	N	4
The former Kid	13	5	♊	18	8½	N	4
The latter Kid	13	49½	♊	18	11½	N	4
In the higher foot	11	4½	♊	10	22	N	4
That above the bright ſtar in the right ſhoulder	24	25½	♊	27	27	N	5
The northern of the two in the loyns	16	52½	♊	18	34½	N	6
The ſouthern	16	6	♊	16	59	N	5
The ſtar below this towards the Weſt	14	58	♊	15	21½	N	5
That following it	17	9	♊	14	4	N	6
That below the Kids about the Buttocks	12	0	♊	15	3	N	5
The former of the two in the right Arm	22	12	♊	15	42	N	5
The following ſtar	22	24	♊	15	43	N	5
Under this in the right leg	22	34	♊	13	49	N	6
In the left ſhin-bone	16	39½	♊	11	15	N	5
In the right foot	18	34	♊	8	51	N	5
The former of the two about *Erichton*	10	4½	♊	14	51	N	5
The ſouthern following	10	31	♊	14	2	N	5
The northern without form between *Ericht.* & the feet of ♊	27	47	♊	6	4	N	4
The ſecond	22	58	♊	4	6	N	4
Under this towards the Eaſt	23	58	♊	2	26	N	4
The former of theſe	19	52	♊	2	28	N	4
The laſt of all	21	55	♊	1	6	N	4

OPHIUCHUS.

In the Head	16	50	♐	35	57	N	3
In the right ſhoulder	19	45	♐	28	1	N	3
The lower and following ſtar in the ſame ſhoulder	21	5	♐	26	11	N	3
The former in the left ſhoulder	4	59½	♐	32	55⅔	N	4
That following in the ſame ſhoulder	6	16	♐	31	56	N	4
In the left elbow	0	3	♐	23	39½	N	4
The more northern in the left hand	26	44⅔	♏	17	19	N	3
The following ſtar more South	27	57	♏	16	30½	N	3
In the right bowing	19	33	♐	15	19	N	4

Denomination of the Stars.	*Longitude* D	'	S	*Latitude* D	'		M
The former and more ſouthern in the right hand	24	13	♐	13	47	N	4
That more northern following in the ſame hand	25	13½	♐	15	20	N	5
In the right Knee	12	24	♐	7	18	N	3
In the left Knee	3	39	♐	11	30	N	3
In the right Shin	14	23	♐	2	12	N	3
The fift of them without form in the milkie way	26	31	♐	33	2	N	4
That above the bright ſtar in the neck of the Serpent	16	48	♏	8	4	N	4
Behind the Hips of *Ophiuchus*	14	49	♐	10	21	N	4
The ſouthern of the two that follow	18	57	♐	26	36½	N	3
The northern	19	48	♐	10	35	N	4
The ſtar above this	18	45	♐	15	18	N	4
That between the left hand and the knee of *Ophiuchus*	0	57	♐	13	19	N	5
That without form about the North ſhoulder	24	30	♐	27	55	N	4
The middle of them	24	38	♐	26	23	N	4
The ſouthern of the three	24	53	♐	24	50	N	4
The former of the four in the right foot	14	1	♐	2	16	N	4
That followeth	15	42	♐	1	32	N	4
The third	16	23	♐	0	20	N	4
The other following	17	12	♐	0	29	N	5
That which toucheth the Heel	17	36	♐	0	58	N	5
In the right leg	16	50	♐	7	10	N	5
That without the leg	21	45	♐	4	20	N	6
The following ſtar of the two in the hand	0	7	♐	23	34	N	5
In the hip of *Ophiuchus*	15	0	♐	10	18	N	5
The ſouthern ſtar following	19	2	♐	8	5	N	4
In the right hand	20	4	♐	10	40	N	5
The northern	19	5	♐	15	6	N	5

The Serpent of OPHIUCHUS.

The former in the mouth	11	35	♏	38	12	N	5
That in the mouth	14	24	♏	39	6½	N	3
In the Temples	17	6	♏	35	25	N	3
In the eduction of the neck	14	21	♏	34	27½	N	3
Neer the left eye	15	10	♏	37	28	N	4
That towards the Noſtrils	16	32	♏	42	37	N	4
The ſecond in the Neck below the Head	12	46½	♏	28	58	N	3
In the middle of the neck	16	30	♏	25	35	N	2
The ſouthern of the three	18	46	♏	24	5	N	3
In the ſecond flexion	20	26½	♏	16	26	N	4
The laſt of the tail but two	24	34	♐	19	57	N	3
The laſt but one	0	12	♑	20	37	N	3
The laſt	10	10	♑	26	59	N	3

The Arrow; or Dart.

The higher and more eaſtern	1	32	♒	39	13	N	4
The middle ſtar going before this	27	55	♑	38	58½	N	5
The ſmall ſtar above the laſt	28	31	♑	36	31	N	6
The higher of the two in *Glyphide*	25	30½	♑	38	53	N	4
The lower of the ſame	25	39	♑	38	16	N	4
The lower without form above the Arrow	0	13	♒	42	43	N	4

The

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		*M*
The higher of them	1	36	♒	44	2	N	4
The third of the informed in *Oxygonio*	23	57	♑	46	3	N	4

The Eagle ; or flying Vulture.

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		*M*
THe ſtar in the Head	29	28½	♑	27	8½	N	6
In the neck	26	53	♑	26	49½	N	3
The bright ſtar neer the ſhoulders	26	9	♑	29	21½	N	2
The little ſtar above the bright ſtar	25	33	♑	30	54	N	6
That in the left ſhoulder	25	26	♑	31	18	N	3
The little ſtar that followeth	26	8½	♑	31	59	N	5
The higher ſtar that goeth before in the lower Wing	21	16½	♑	28	46	N	4
The lower ſtar that followeth in the Wing	22	14	♑	26	35	N	5
The tail of the Vulture	14	15	♑	36	16	N	3
That without form going next before the tail	12	44	♑	37	40	N	3
The middlemoſt of thoſe without form above that tail	9	12	♑	43	32½	N	4
The ſeven without form, which followeth of the three	9	17	♑	41	5	N	4

ANTINOUS.

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		*M*
IN the left hand	29	21½	♑	18	48	N	3
In the right ſide	20	17½	♑	20	14½	N	3
In the Knee	19	17	♑	14	28	N	3
In the right arm	18	1	♑	24	56	N	3
In the Breſt	24	50	♑	21	38	N	3
In the right foot	11	46	♑	17	41	N	3
That without form going before this	10	29	♑	16	57	N	4

The Dolphin.

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		*M*
THe bright ſtar of the tail	8	32	♒	29	8	N	3
That which followeth the tail	9	48	♒	28	52½	N	6
That below the tail	9	42	♒	27	34	N	6
The more Southern ſtar of the former ſide in the *Rhombos*	10	56	♒	31	57½	N	3
The more northern of the ſame ſide	11	50½		33	5	N	3
The more ſouthern of the following ſide	13	36½	♒	32	0	N	3
In the Head	13	52	♒	32	47	N	3
Which goes before in the former ſide of the four	10	17	♒	32	8½	N	5
The former and loweſt of the two in the *Rhombos*	9	18	♒	30	41	N	6
The ſtar following of them	10	42	♒	31	41	N	6

The Horſe-Colt.

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		*M*
THe former ſtar of the Head	17	32½	♒	20	12	N	4
The following ſtar of the Head	19	54½	♒	21	6	N	4
The former ſtar of the Mouth	17	54	♒	25	16	N	4
That following	18	54½	♒	24	52	N	4

Pe-

PEGASUS; *Or the Winged-Horſe.*

Denomination of the Stars.	*Longitude*			*Latitude*			*M*
	D	′	S	D	′		
THe mouth of *Pegaſus*	26	22	♒	22	7½	N	3
The Head	1	15½	♓	16	25	N	4
That in the Head towards the South	29	45½	♒	15	43½	N	5
The lower and following in the Main	13	0	♓	14	30	N	6
The higher preceding in the Main	12	44	♓	15	43	N	6
The bright ſtar of the Neck	10	39½	♓	17	41	N	3
The following ſtar in the Neck	12	25	♓	18	29	N	5
The left Leg	3	23	♓	36	42½	N	4
The left Knee	8	50	♓	34	19	N	4
The right Leg	14	3	♓	41	8½	N	4
The former of the two in the Breaſt	17	29½	♓	28	49	N	4
That following	18	53½	♓	29	24½	N	4
The right Knee	20	10	♓	35	7½	N	3
In the ſame Knee towards the ſouth	19	25	♓	34	24	N	5
The former of the two in the Wing	25	33	♓	25	35	N	6
The more ſouthern ſtar following in the Wing	27	6	♓	24	50	N	6
The firſt ſtar of the Wing: *Marchab.*	17	56½	♓	19	26	N	2
In the putting forth of the thigh, *Scheat*	23	49	♓	31	7	N	2
The end of the Wing	3	38	♓	12	35	N	2
In the Neck of *Pegaſus*	6	28	♓	20	51	N	4
Below the mouth and above the foot	24	51	♒	33	21	N	4
That above the ſame	28	47	♒	36	11	N	4
Following the firſt	15	15	♓	23	16	N	4

ANDROMEDA.

THe Head	8	47	♈	25	42	N	2
The loweſt in the right ſhoulder	17	6½	♈	27	6½	N	5
The lower in the left ſhoulder	15	25	♈	23	3½	N	4
The more ſouthern of the three in the right Arm	14	58	♈	31	33	N	5
The northern	15	45½	♈	33	20½	N	4
The middlemoſt	16	7	♈	32	14½	N	5
The more ſouthern in the higher hand	10	28	♈	40	56	N	4
The more northern	11	46	♈	41	44	N	4
The obſcure ſtar there	14	23	♈	42	8	N	5
The higheſt of all in the north hand	12	47	♈	43	49	N	4
The former and higher of the two in the left arm	15	9	♈	17	48	N	4
In the left Elbow	16	53½	♈	15	58	N	5
The more ſouthern in the Girdle	24	49	♈	25	59	N	2
The middlemoſt	24	6	♈	30	33½	N	4
The northern	23	36	♈	32	30½	N	4
The bright ſtar in the ſouth Foot	8	39	♉	27	46½	N	2
The extream ſtar in the higher Foot	9	6½	♉	36	49	N	5
The brighter ſtar preceding in the right Foot	6	52	♉	35	21½	N	4
The higheſt in the left Calf	5	16	♉	28	59	N	5
The lower	3	23	♉	27	54½	N	5
At the right Knee	0	56	♉	36	20	N	5
That in the extream Ring of the Chain	24	0	♓	57	19	N	4
The brighter ſtar above in the left ſhoulder	16	19½	♈	24	20	N	3

The Triangle.

Denomination of the Stars.	*Longitude* D ′ S	*Latitude* D ′	*M*
In the top of the Triangle	1 19 ♉	16 49½ N	4
In the Baſe towards the North	6 49½ ♉	20 33 N	4
The middlemoſt	7 59 ♉	19 29 N	5
The more Southern in the Baſe	7 58 ♉	18 57 N	4

COMA BERENICES.

In the *Cuſpis* of firſt and North Triangle	18 17 ♍	28 25 N	3
The higher touching this towards the South	18 42 ♍	27 23 N	5
The lower of them	18 46 ♍	27 20 N	4
That which followeth them	19 19 ♍	27 7 N	4
The former of the 2 Southern ſtars neer together	18 25 ♍	25 51 N	4
The other towards the Eaſt	18 48 ♍	26 7 N	4
The firſt towards the South	18 00 ♍	23 30 N	4
The higheſt of the 3 ſtars following that ſeeme to touch	21 10 ♍	25 16 N	4
The other going before	20 51 ♍	24 56 N	4
The loweſt and following ſtar	22 52 ♍	24 00½ N	4
The laſt in the extenſion of the Haire	28 58 ♍	32 46 N	4
That preceding	27 49 ♍	31 42 N	4
That in the *Cuſpe*, between this and the firſt	27 17 ♍	30 16 N	4
That towards the ſouth of the *Cuſpe* of the little △	28 15 ♍	28 32 N	5

⁂

The third part of the Catalogue, conteining the Southern Images of the fixed Stars.

The Whale.

The ſtar in the ſnout	9 31 ♉	7 50 S	
The bright ſtar in the jaw of the Whale	8 47 ♉	12 37 S	
The middlemoſt in the mouth	3 53½ ♉	12 2½ S	3
The former of the 3 neer the eye-lid	2 2 ♉	14 32 S	3
That below the eye	1 54 ♉	5 52 S	4
That above the eye	6 7 ♉	5 36 S	4
In the hinder part of the head	28 29½ ♈	4 19 S	4
The former ſtar North in the breaſt of □	24 9 ♈	25 17 S	4
The former of the 2 lower ſtars towards the ſouth	24 32½ ♈	28 31 S	4
The ſouthern of the following ſtar in the breaſt	28 11½ ♈	28 16½ S	4
The northern preceding	27 47½ ♈	25 58 S	3
In the mid-belly	12 25 ♈	25 1 S	4
The loweſt in the Belly	13 50 ♈	31 4 S	4
The northern ſtar of the Belly	16 25 ♈	20 19 S	3
The eaſtern of the 2 bright ſtars in the back	10 42½ ♈	15 46 S	3
The more Weſtern of them	6 11½ ♈	16 55 S	3
The North ſtar of the taile	25 23 ♓	10 1 S	3
The ſouthern, or bright ſtar of the taile	26 56 ♓	20 47 S	2

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		*M*
That without formfollowing the bright ✳ of the jaw *ad ortũ*	12	45	♉	14	30	S	5
That goes before the nor. ✳ of the belly toward the South	15	4½	♈	21	55	S	5
That in a right line with the 3 and 5 of the Goat	2	49½	♉	9	12	S	4

ORION.

THe higher of the three joyn'd together in the Head	18	11½	♊	13	26	S	4
The more Weſtern	18	6½	♊	13	54	S	5
The third towards the Eaſt	18	33½	♊	14	4½	S	5
The bright ſhoulder or following ſtar	23	12	♊	16	6	S	2
The left or preceding ſhoulder	15	23	♊	16	53	S	2
The following ſtar in the left ſhoulder	16	47	♊	17	22	S	5
That in the right arm	25	4½	♊	14	51	S	4
In the right fathome	28	30½	♊	11	30	S	6
The more ſouthern in the right hand	27	23½	♊	9	15	S	4
That goeth before towards the right hand	26	21	♊	8	44	S	4
Next to the higheſt in the right hand	27	22	♊	7	20½	S	6
The higheſt and laſt of them in the hand	28	8½	♊	7	19	S	6
The former of the two in *Colorobo*	23	9	♊	3	12½	S	5
The following ſtar of them	25	21½	♊	3	21	S	5
That below the right ſhoulder towards the Weſt	18	56½	♊	19	17	S	5
The following of the two obſcure ſtars in the Back	17	40	♊	19	36	S	5
The former of them	16	46	♊	19	52½	S	6
The former of the four in the Back	15	34	♊	20	8½	S	6
The moſt northern of the 9 in the Buckler	7	53	♊	8	17	S	5
The ſecond	8	48	♊	9	7	S	4
The third	8	10	♊	11	6	S	6
The fourth	8	0	♊	12	25½	S	4
The fifth	6	49	♊	13	3½	S	4
The ſixth	6	23	♊	15	27	S	4
The ſeventh	6	33	♊	16	50	S	4
The eighth	6	58	♊	20	2	S	4
The laſt	7	57	♊	20	55	S	4
The firſt ſtar of the Belt	16	50	♊	23	38	S	2
The middlemoſt	17	54	♊	24	33½	S	2
The laſt	19	6½	♊	21	21½	S	2
That in the hilt of the ſword	14	37½	♊	25	36	S	3
The higheſt of the three in the ſword	17	28	♊	28	9½	S	5
The middle ſtar of the ſword	17	24	♊	28	45	S	3
The ſouthern	17	27	♊	29	17	S	3
The former of the two below the ſword	16	20	♊	30	37½	S	4
The following of them	18	23	♊	30	38	S	5
The bright ſtar in the left foot, *Rigel.*	11	17	♊	31	11	S	1
That in the left heel	12	15½	♊	29	53	S	4
That in the calf of the left foot	14	2	♊	31	0	S	5
In the right knee	20	49	♊	33	8	S	3
That going before the laſt ſtar of the Belt to the South	18	39	♊	26	0½	S	4
That on the Back going before this	14	34½	♊	19	40	S	5
The following of the two above the Belt	14	45	♊	24	6	S	6
The former	13	59	♊	23	32	S	5
Above this on the right ſide	14	57	♊	21	23	S	5
The former under the Arm and Buckler	11	58	♊	20	8	S	4
The former of the two in the left ſide	19	45	♊	21	58	S	5

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		M
The following ſtar	22	25½	♊	21	39	S	5
The following ſtar without form	24	10	♊	22	57	S	5
The higher of the three in the left hand	13	36½	♊	11	45	S	6
The middlemoſt	11	33½	♊	13	8	S	6
The ſouthern	11	0	♊	14	24	S	6
The former of the ten without form above *Orion*	28	44	♊	29	31	S	4
The following ſtar	2	43	♋	29	49	S	4
Above this	2	22	♋	28	4	S	5
The former of the three in a right line	1	8	♋	18	47	S	4
The middlemoſt	2	58	♋	15	56½	S	4
The northern	4	50	♋	13	15	S	4
Below the right line towards the South	2	58	♋	18	24	S	5
Above this towards the Eaſt	6	36	♋	14	59	S	5
The former of the two below the little Dog	7	14½	♋	20	33	S	4
That following	14	0	♋	22	47	S	4

ERIDANUS; *A River.*

THe ✱ at the left foot of *Orion* in the beginning of the (River	9	40	♊	31	35½	S	4
Above the foot of *Orion* in the River	9	42	♊	27	54½	S	3
The following of the two other ſtars	7	39	♊	29	52	S	5
That which goeth before	5	29½	♊	27	51	S	4
The following of the two higher ſtars	3	45½	♊	25	34	S	4
The former of them	1	14½	♊	25	11½	S	4
The follower of them after a little ſpace	18	18	♉	33	13	S	3
That goeth before this	15	22	♉	28	46½	S	4
The third ſtar going before	15	7½	♉	27	47	S	3
That going formoſt of the four	12	45	♉	24	34	S	3
The firſt of thoſe that touch the Whale	3	10	♉	24	34	S	3
Between this and the third	5	36	♉	23	58½	S	4
The third which followeth	8	16	♉	25	59	S	3
The inferior going before	23	49	♉	30	25	S	5
That above the ſame	23	53	♉	27	32	S	4
The following ſtar	24	58	♉	28	9½	S	4
The higher ſtar eaſt	27	46	♉	25	3	S	5
The former of the two between *Erid.* and the Bull	16	25	♉	18	26	S	4
The following ſtar ſouth	20	7	♉	22	45	S	4

LEPUS; *The Hare.*

THe higher ſtar in the former Ear	10	14½	♊	34	34	S	5
The lower ſtar in the ſame Ear	10	20½	♊	35	54	S	4
The higher ſtar of the following Ear	12	27	♊	35	18	S	6
The lower ſtar of the ſame Ear	12	14	♊	36	14	S	5
That in the Head	9	49	♊	39	4	S	5
The extream ſtar of the forefeet	6	25½	♊	45	0	S	4
That in the back or mid-body	15	49½	♊	41	5½	S	3
In the left Arm	14	6½	♊	43	57	S	3
The more ſouthern of the two in the hinder feet	19	21½	♊	45	49½	S	3
The more northern of them	21	36	♊	44	18	S	3
The former in the Back	20	26	♊	38	16	S	4
The hindermoſt in the Back	23	27½	♊	37	40½	S	4
The laſt in the tail	26	22	♊	38	26	S	4

The greater Dog.

Denomination of the Stars.	*Longitude* D ′ S	*Latitude* D ′	*M*
THe moſt glittering ſtar in the mouth cal'd *Sirius*	8 35½ ♋	39 30 S	1
That in the forehead neer the right Ear	19 1½ ♋	34 50 S	4
In the mid-forehead	11 27 ♋	36 43 S	5
That under the left Ear	14 6 ♋	38 2½ S	3
In the Neck	12 3 ♋	39 30 S	4
In the right ſhoulder of the fore-feet	6 32½ ♋	42 12 S	5
That in the end of the forefoot	1 42½ ♋	41 18½ S	2
That in the Back	15 30½ ♋	46 9½ S	5
In the Breaſt, *viz.* the middlemoſt	12 36½ ♋	46 39½ S	5
That in the Belly	17 55 ♋	48 30 S	3
In the Belly between the hinder thighs	15 21½ ♋	51 24½ S	3
The lower of the former ſtar of the right foot	1 7 ♋	51 46½ S	3
That in the tail	24 11½ ♋	51 24½ S	3

PROCYON; *The leſſer Dog.*

IN the Neck	16 39½ ♋	13 33½ S	3
In the thigh, *Procyon*	20 18½ ♋	15 57 S	2
Above the bright ſtar of the neck	16 49 ♋	12 51 S	6
That out of form above this	16 42½ ♋	9 46 S	6
That following towards the tail of Cancer	20 57½ ♋	10 19½ S	5

ARGO; *The Ship.*

THat in the top of the ſtern	5 53½ ♌	43 18 S	3
The higheſt ſtar of the ſhip	0 35½ ♌	44 58½ S	3
The former ſtar of the Buckler	28 0 ♋	47 28 S	3
In the ſaile	4 6½ ♌	32 7 S	4
That out of form towards the ſouth	4 27 ♌	38 31 S	4
The lower of the 3 in the maſt	12 26½ ♌	32 56 S	6
Above this	12 51½ ♌	30 18 S	4
That above	10 1½ ♌	24 29½ S	4
The former of the 2 in the ſail-yards	29 26 ♌	21 39½ S	4
That following	4 20½ ♍	22 29½ S	3
That out of form between the ſaile and milkie way	23 44 ♍	30 30 S	3

HYDRA; *Or the Water Serpent.*

THe former ſtar in the head	5 39½ ♌	14 37 S	5
Above the firſt towards the north	6 46 ♌	14 16½ S	4
The more northern in the hinder part of the head	6 48 ♌	11 8 S	4
That goeth before the third towards the ſouth	7 22½ ♌	11 36 S	5
The more eaſtern of all the ſtars in the head	9 0½ ♌	11 1 S	4
That which goeth before in the neck	11 51½ ♌	11 5½ S	6
The following ſtar in the eduction of the neck	14 41½ ♌	13 5 S	4
The middle ſtar of the neck and former of the 3	20 11 ♌	15 0 S	5
The northern of the 3 in the bending of the neck	22 4 ♌	14 17½ S	4

The

Denomination of the Stars.	*Longitude* D	′	S	*Latitude* D	′		*M*
The ſouthern in the joynt	19	53½	♌	16	46	S	5
The bright ſtar call'd the Heart of *Hydra*	21	45½	♌	22	24	S	1
That following next the heart	27	12	♌	26	23½	S	4
That following after this	0	9	♍	26	12	S	5
The former of the two that touch above this	2	48	♍	23	13	S	5
The following ſtar of them	3	53	♍	21	51	S	4
The fift ſtar from the Heart	9	31	♍	24	38	S	4
That in a right line with this and the following ſtar	12	41	♍	23	31	S	5
The former next the water-Pot	14	51	♍	21	48½	S	4
Out of form next before the Head	4	45½	♌	12	27	S	4
Under the Baſe of the north water-Pot	23	1½	♍	25	36	S	4
The ſouthern	23	49	♍	30	17	S	5
Under the tail	21	24	♎	13	43	S	5
The little ſtar going before this	19	24	♎	14	37	S	6
That out of form before the head of *Hydra*	28	44	♋	10	19	S	3

CRATER; *Or the Water-Pot.*

THat in the Baſe of the Water-Pot	18	13	♍	22	41	S	4
The following of the two in the middle	53	43	♍	19	39	S	4
The former of them	21	10½	♍	17	25	S	4
The former of the two above the Water-Pot	20	27	♍	13	10	S	4
The following ſtar of them	23	2	♍	11	17	S	4
The former of the two lower ſtars	28	30	♍	18	10	S	4
That following after	0	33	♎	16	2	S	4
In the middle Water-Pot	24	55	♍	14	9	S	5

The Raven.

THat neer the eye	6	8	♎	19	39	S	4
The former of the two higher in the □	5	13	♎	14	25	S	3
The following ſtar	7	55	♎	12	7	S	3
The following of the lower ſtar in the □	11	49	♎	17	59	S	3
In the Bill	6	38	♎	21	46	S	4
In the Neck	8	14	♎	18	14	S	5
In the left Wing above the bright ſtar	8	21½	♎	11	28	S	5

CENTAURUS.

THe moſt ſouthern of the four in the Head	1	27	♏	21	49	S	5
That more towards the north	0	59	♏	19	8	S	5
The former of the two intermediate ſtars	0	12	♏	20	51	S	5
The former and remainder of the four	1	3	♏	20	12	S	5

The End of the Catalogue of TYCHO BRAHE.

Some Vſes of the following Tables of *Logarithmes*, *Sines*, and *Tangents*.

AMongſt the many admirable ways, that have been from time to time invented, for propagating the Arts Mathematicall, (and eſpecially *Trigonometry*) that of *Logarithmes*, (invented by the right honourable the Lord *Nepeir*, Baron of *Marchiſton*) may chalenge the priority, and the Tables of *Artificiall Sines* and *Tangents*, compoſed by Mr. *Edmund Gunter*, Profeſſor of *Aſtronomy* in *Greſham* Colledge *London*, for that they expedite the Arithmeticall Work in moſt Queſtions, Multiplication being performed by Addition, and Diviſion by Subſtraction, the *Square Root* extracted by *Bypartion*, and the *Cubique Root* by *Tripartion*, ſo that by help of theſe Numbers, and the aforeſaid *Sines* and *Tangents*, more may be performed in the ſpace of one hour, then by the Naturall Numbers, or Vulgar Arithmetick can be in ſix. Now of what frequent uſe the Doctrine of *Triangles*, both plain and Sphericall is in *Aſtronomie*, (for the reſolution of which the Tables following chiefly ſerve) let the preceding Work teſtifie, and therefore I think it not amiſſe here in this place, to inſert ſome few familiar Propoſitions, to ſhew the uſe of the Canon and Tables of *Sines* and *Tangents* following.

PROP. I.

How to finde the Logarithme *of any number under 1000.*

EVery page in the Table of *Logarithmes* is divided into 11 Columns, in the firſt of which Columns (having the letter N at the head thereof) are all numbers ſucceſſively continued from 1 to 1000, ſo that to finde the *Logarithme* of any Number, is no more but to finde the Number in the firſt Columne, and in the ſecond Columne you ſhall have the *Logarithme* anſwering thereunto.

Example. Let the number given be 325 and it is required to finde the *Logarithme* thereof, in the Table of Logarithmes in the firſt Columne thereof (under the letter N) I finde the number 325, and right againſt it in the next Columne I finde 511883 which is the Logarithme of 325. In the ſame manner may you finde the Logarithme of any number under 1000 As the Logarithme of 408 is 610660, and the Logarithme of 800 is 90089, &c.

But here is to be noted, that before every Logarithme muſt be placed his proper Characteriſtik: *viz.* If the Number conſiſt but of one figure (as all numbers under 10,) then the Characteriſtik is 0: If the Number conſiſt of two figures, (as do all numbers between 10 and 100,) then the Characteriſtik is 1: If the Number conſiſt of three figures (as all numbers betvveen 100 and 1000,) then the Characteriſtik is 2: If the Number conſiſt of four figures, (as all betvveen 1000 and 10000,) then the Characteriſtik muſt be three. In brief, *The Characteriſtik of any Logarithme muſt conſiſt of a Unit leſſe then the given Number conſiſteth of Digits or Places.* And by obſerving this Rule, the Logarithm of 325 is 2,511883 and the Logarithme of 408, is 2,610660, and the Log. of 800, is 2,903089, &c.

PROP. 2.

A Logarithme being given to finde the abſolute Number thereunto belonging.

BY the former Obſervation, the Characteriſtik will declare, what number of places the abſolute number conſiſteth of.

Example. Let the Logarithme given be 2,143015. Now becauſe the Characteriſtik is 2, I know the abſolute Number conſiſteth of three places, and therefore may be found in the ſecond Column of the Table of Logarithmes (having O at the top thereof) againſt which I finde 139, which is the abſolute Number anſwering to the Logarithme 2,143015.

PROP. 3.

How to finde the Logarithme of a Number that conſiſteth of four places.

YOu muſt finde the three firſt figures of the given Number in the firſt Column, as before, and ſeek the laſt figure thereof amongſt the great figures in the head of the page, and in the common Area, or meeting of theſe two lines is the Logarithme you deſire, if before it, you prefixe its proper Characteriſtik.

Example.

Let it be required to finde the Logarithme of 5628, I finde 562 (the three firſt figures) in the firſt Column, and 8 (the laſt figure) in the head of the Table) then going down from 8 (in the head of the Table) till I come againſt 562 (in the firſt Column) there I finde 750354, before which I place three for the Characteriſtik, which is 3,750354, and that is the Logarithme ſought for.

PROP. 4.

Any Number of Degrees and Minutes being given, to finde the Artificiall Sine *and* Tangent *thereof.*

SUppoſe it were required to finde the *Sine* and *Tangent* of 18 deg. 20 min. I turn to the Table of *Sines*, and in the head thereof I finde *Degrees* 18, then in the firſt Column (under M) I finde 20′, and right againſt it is 9,497682 for the *Sine*, and 9,520305 for the *Tangent* of 18^d 20′.

If any Sine *and* Tangent *be given, it is eaſie to finde what Degrees and Minutes anſwer thereunto.*

As ſuppoſe, 9,525275, were a *Sine* given, I look for this Number in the Table of *Sines*, and I finde it to ſtand againſt 19^d 35′, and therefore is the *Sine* thereof: The ſame muſt be done for *Tangents*.

And here note, that if you finde the Degrees in the head of the Table, you muſt finde the Minutes in the firſt Column towards the left hand, as in the example, but if you finde the Degrees in the bottome of the Table, then you muſt finde the Minutes in the laſt Column towards the right hand. For all Arches under 45 degrees, are found in the head, and all above 45 degrees are found at the foot of the Table.

Chiliades

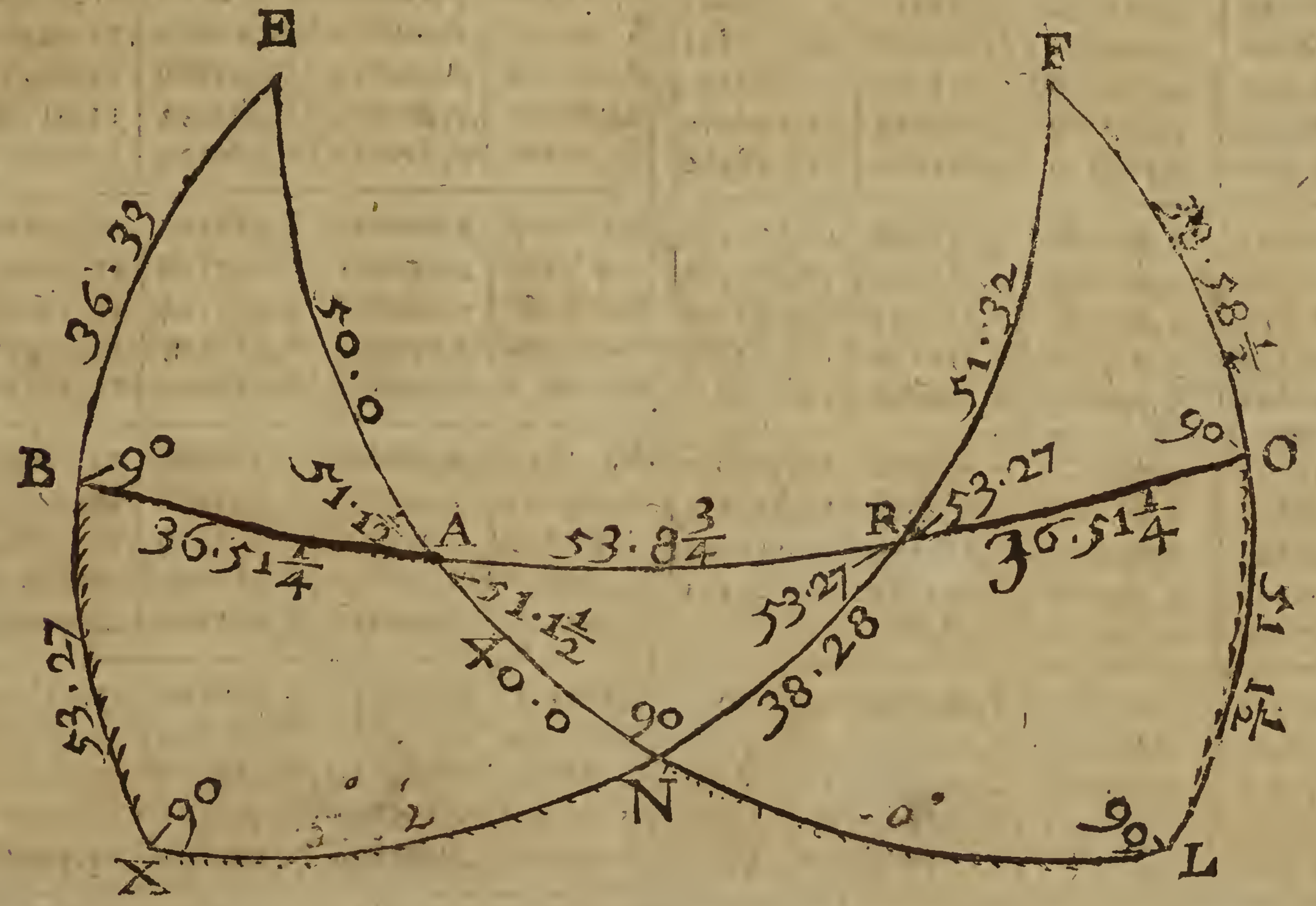
CANON TRIANGULORUM *LOGARITHMICUS.*

OR,

A TABLE of Artificiall *Sines* and *Tangents*, to every Degree and Minute of the *Quadrant.*

The common Radius being 10,000000.

By VINCENT WING. *Philomathemat.*



Ex Angulis Latera vel ex Lateribus Angulos & mixtim, in Triangulis tam planis quàm Sphæricis, aſſequi, ſumma gloria Mathematici eſt: Sic enim Cœlum, & Terras & Maria fœlici & admirando calculo menſurat. Fran. Vieta.

LONDON:
Printed by ROBERT LEYBOURN, for the
Company of STATIONERS, 1651.

Nn

Degree 0.

M	Sine	*Co-ſine.*	Tanget.	*Co-tang.*
0	0,000000	10,000000	0,000000	*Infinita*
1	6,463726	9,999999	6,463726	13,536274
2	6,764756	9,999999	6,764756	13,235244
3	6,940847	9,999999	6,940847	13,059153
4	7,065786	9,999999	7,065786	12,934214
5	7,162696	9,999999	7,162696	12,837304
6	7,241877	9,999999	7,241878	12,758122
7	7,308824	9,999999	7,308825	12,691175
8	7,366816	9,999999	7,366817	12,633183
9	7,417968	9,999999	7,417970	12,582030
10	7,463726	9 999998	7,463727	12,536273
11	7,505118	9,999998	7,505120	12,494880
12	7,542906	9,999997	7,542909	12,857091
13	7,577668	9,999997	7,577272	12,422328
14	7,609853	9,999996	7,609857	12,390143
15	7,639816	9,999996	7,639826	12,360180
16	7,667844	9,999995	7,667849	12,332151
17	7,694173	9,999995	7,694179	12,305821
18	7,718977	9,999994	7,719003	12,281997
19	7,742477	9,999993	7,742484	12,257516
20	7,764754	9,999993	7,764761	12,235239
21	7,785943	9,999992	7,785951	12,214049
22	7,806146	9,999991	7,806145	12,193845
23	7,825451	9,999990	7,825460	12,174540
24	7,843934	9,999989	7,843944	12,156056
25	7,861662	9,999989	7,861674	12,138326
26	7,878695	9,999988	7,878708	12,121292
27	7,895085	9,999987	7,895099	12,104901
28	7,910879	9,999986	7,910894	12,089106
29	7,926119	9,999985	7,926134	12,073866
30	7,940842	9,999983	7,940858	12,059142
31	7,955082	9,999982	7,955100	12,044900
32	7,968870	9,999981	7 968889	12,031111
33	7,982233	9,999980	7,982253	12,017747
34	7,995198	9 999978	7,995215	12,004781
35	8,007787	9,999978	7,007810	11,992191
36	8,020021	9,999976	8,020044	11,979956
37	8,031919	9,999975	8,031945	21 968055
38	8,043501	9,999973	8,043527	11,956473
39	8,054781	9,999972	8,054809	11,945181
40	8,065776	9,999971	8,065806	11,934194
41	8,076500	9 999969	8,076531	11,923469
42	8,086965	9,999968	8,086997	11,913003
43	8,097183	9,999966	8,097217	11,902783
44	8,107167	9,999964	8,107203	11,892797
45	8,116926	9,999963	8,116963	11,883037
46	8,126471	9 999961	8,126510	11,873490
47	8,135810	9,999959	8,135851	11,864149
48	8,144953	9,999958	8,144996	11,855004
49	8,153907	9,999956	8.153952	11,846048
50	8,162681	9,999954	8,162737	11,837273
51	8,171280	9,999952	8,171328	11,828672
52	8,179713	9,999950	8,179763	11,820237
53	8,187985	9,999948	8,188036	11,811964
54	8,196102	9,999946	8,196156	11,803844
55	8,204070	9,999944	8,204126	11 795874
56	8,211895	9,999942	8,211953	11,788047
57	8,219581	9,999940	8,219641	11,780359
58	8,227134	9,999938	8,227195	11,772805
59	8,234557	9 999936	8,234621	11,765379
60	8,241855	9 999934	8,241921	11,758079
	Co-ſine	Sine	*Co-tang.*	Tangent.

Degree 89.

Degree 1

Sine	*Co-ſine*	Tanget.	*Co-tang.*	
8,241855	9 999934	8,241921	11,758079	60
8,249033	9,999932	8,249102	11,750898	59
8,256094	9,999929	8,256165	11,743835	58
8,263042	9,999927	8,263115	11,736885	57
8,269881	9,999925	8,269956	11,730044	56
8,276614	9,999922	8,276691	11,723309	55
8,283243	9,999920	8,283323	11,716677	54
8,289773	9,999918	8,289856	11,716144	53
8,296207	9,999915	8,296292	11,703708	52
8,302546	9,999913	8,302634	11,697366	51
8,308794	9,999910	8,308884	11,691116	50
8,314954	9,999907	8,315046	11,684954	49
8,321027	9,999905	8 321122	11,678878	48
8,327016	9,999902	8,327114	11,672886	47
8,332924	9,999899	8,333025	11,666975	46
8,338753	9,999897	8,338856	11,661144	45
8,344504	9 999894	8,344610	11,655390	44
8.350180	9,999891	8,350289	11,649711	43
8,355783	9,999888	8,355895	11,644105	42
8,361315	9 999885	8,361430	11,638570	41
8,366777	9,999882	8,366895	11,633105	49
8,372171	9 999379	8,372292	11,627708	39
8.377499	9,999876	8,377622	11,622378	38
8,382762	9,999873	8,382889	11,617111	37
8,387962	9,999870	8,388092	11,611908	36
8,393101	9,999867	8,393234	11,606766	35
8,398179	9,999864	8,398315	11,601685	34
8 403199	9,999861	8,403338	11,596662	33
8,408161	9,999858	8,408304	11,591696	32
8,413068	9,999854	8,413213	11,586787	31
8,417919	9,999851	8,418068	11,581932	30
8 422717	9,999848	8,422869	11,577131	29
8,427462	9,999844	8 427618	11,572382	28
8,432156	9,999841	8,432315	11,567685	27
8,436800	9,999838	8,436962	11,563038	26
8,441354	9,999834	8,441560	11,558440	25
8,445941	9,999831	8 446110	11,553990	24
8,450440	9,999827	8 450613	11,549387	23
8,454893	9 999824	8,455070	11,544930	22
8,459301	9 999820	8,459481	11,540519	21
8,463665	9 999816	8 463849	11,536151	20
8.467985	9,999812	8,468172	11,531828	19
8,472263	9,999809	8,472454	11,527546	18
8,476498	9,999805	8,476693	11,523307	17
8,480693	9,999801	8 480892	11,519108	16
8,484848	9,999797	8,485050	11,514950	15
8,488963	9,999794	8,489170	11,510830	14
8,493040	9,999790	8,493250	11,506750	13
8,497078	9,999786	8,497293	11,502707	12
8,501080	9,999782	8,501298	11 498702	11
8,505045	9,999778	8,505267	11,494733	10
8,508974	9 999774	8,509200	11,490800	9
8,512867	9,999769	8 513098	11,486902	8
8,516726	9.999765	8,516961	11,483039	7
8,520551	9,999761	8,520790	11,479210	6
8,524343	9,999756	8,524586	11,475414	5
8,528102	9,999753	8,528349	11,471651	4
8,531828	9 999748	8,532080	11,467920	3
8,535523	9,999744	8,535779	11,464221	2
8,539186	9,999740	8,539447	11,460553	1
8,542819	9,999735	8,543084	11,456916	0
Co-ſine	Sine	*Co-tang.*	Tangent,	M

Degree 88.

Degree 2.

M	Sine	*Co-ſine.*	Tangēt,	*Co-tang.*
0	8,542819	9,999735	8,543084	11,456916
1	8,546422	9,999731	8,546691	11,453309
2	8,549995	9,999726	8,550268	11,449732
3	8,553558	9,999722	8,553817	11,446183
4	8,557054	9,999717	8,557336	11,442664
5	8,560540	9,999713	8,560827	11,439172
6	8,563999	9,999708	8,564291	11,435709
7	8,567431	9,999703	8,567727	11,432272
8	8,570836	9,999699	8,571137	11,428863
9	8,574214	9,999694	8,574520	11,425480
10	8,577566	9,999689	8,577877	11,422123
11	8,580892	9,999685	8,581208	11,418792
12	8,584193	9,999680	8,584514	11,415486
13	8,587469	9,999675	8,587795	11,412205
14	8,590721	9,999670	8,591051	11,408949
15	8,593948	9,999665	8,594283	11,405717
16	8,597152	9,999660	8,597492	11,402508
17	8,600332	9,999655	8,600677	11,399323
18	8,603488	9,999650	8,603838	11,396161
19	8,606622	9,999645	8,606978	11,393022
20	8,609734	9,999640	8,610094	11,389906
21	8,612823	9,999635	8,613189	11,386811
22	8,615891	9,999629	8,616262	11,383738
23	8,618937	9,999624	8,619313	11,380687
24	8,621967	9,999619	8,622343	11,377657
25	8,624965	9,999614	8,625352	11,374648
26	8,627948	9,999608	8,628340	11,371660
27	8,630911	9,999603	8,631308	11,368692
28	8,633854	9,999597	8 634456	11,365744
29	8,636776	9,999592	8,637184	11,362816
30	8,639679	9,999586	8,640093	11,359907
31	8,642563	9,999581	8,642982	11,357017
32	8,645428	9,999575	8,645853	11,354147
33	8,648274	9,999570	8,648704	11,351296
34	8,651102	9,999564	8,651538	11,348463
35	8,653911	9 999558	8,654352	11,345648
36	8,656702	9,999553	8,657149	11,342851
37	8,659475	9,999547	8 659928	11,340072
38	8,662230	9,999541	8,662689	11,337311
39	8,664968	9,999535	8,665433	11,334567
40	8,667689	9,999529	8,668160	11,331840
41	8,670393	9,999523	8,670869	11,329130
42	8,673080	9,999518	8,673563	11,326437
43	8,675751	9,999512	8,676239	11,323761
44	8 678405	9,999506	8,678899	11,321100
45	8,681043	9,999499	8,641544	01,318456
46	8,683665	9,999493	8,684172	11,315828
47	8,686272	9,999487	8,686784	11,313216
48	8,688892	9,999481	8 689381	11,310619
49	8,691438	9,999475	8,691963	11,308037
50	8,693998	9,999469	8,694529	11,305471
51	8,696543	9,999462	8,697081	11,302919
52	8 699073	9,999456	8,699617	11,300383
53	8,701589	9,999450	8,702139	11,297861
54	8,704090	9,999443	8,704646	11,295354
55	8,706576	9,999437	8,707139	11,292860
56	8,709049	9 999431	8,709618	11,290381
57	8,711507	9,999424	8,712083	11,287917
58	8,713952	9,999818	8,714534	11 235466
59	8,716383	9,999411	8,716972	11,283028
60	8,718800	9,999404	8,719396	11,280604
	Co-ſine	Sine	*Co-tang.*	Tangent

Degree 87.

Degree 3.

Sine	*Co-ſine*	Tangēt.	*Co-tang.*	
8,718800	9,999404	8,719396	11,280604	60
8,721204	9 999398	8,721806	11,278194	59
8,723595	9.999391	8 724254	11,275796	58
8 725972	9,999384	8,726588	11,273412	57
8,728336	9,999378	8,728959	11,271041	56
8,730688	9,999371	8,731317	11,268683	55
8,733027	9 999364	8,733663	11,266337	54
8,735354	9,999357	8,735996	11,264004	53
8,737667	9,999350	8,738317	11,261683	52
8,739969	9,999343	8,740626	11,259374	51
8.742259	9,999336	8.742922	11,257078	50
8,744536	9,999329	8,745207	11,254793	49
8,746801	9,999322	8,747479	11,252521	48
8,745955	9 999315	8,749740	11,250240	47
8.751297	9,999308	8.751989	11,248011	46
8,753528	9,999301	8,754227	11,245773	45
8,755747	9,999294	8.756453	11,243547	44
8,757955	9,999286	8,758668	11,241332	43
8,760151	9 999279	8 760872	11,239128	42
8,762337	9,999272	8,763065	11,236935	41
8,764511	9,999265	8,765246	11,234754	40
8,766675	9,999257	8,767417	11,232583	39
8,768828	9,999250	8,769578	11,230422	38
8,770970	9,999242	8 771727	11,228273	37
8,773101	9.999235	8,773866	11,229134	36
8,775223	9.999227	8,775995	11,224005	35
8,777333	9,999220	8,778114	11,221886	34
8,779434	9,999212	8,783222	11,219778	33
8.781524	9,999204	8,782320	11,217680	32
8,783605	9,999197	8,784404	11 215592	31
8,785675	9,999189	8,786486	11,213514	30
8,787736	9.999181	8,788554	11,211446	29
8,789787	9.999174	8,790613	11,209387	28
8,791828	9,999166	8,792662	11,207338	27
8,793859	9,999158	8,794701	11,205299	26
8,795881	9 999150	8,796731	11,203269	25
8,797894	9,999142	8,798752	11,201248	24
8,799897	9,999134	8,800763	11,199237	23
8,801891	9.999126	8,802765	11,197235	22
8,803876	9.999118	8,807458	11,195242	21
8,805852	9,999110	8,806742	11,193258	20
8,807819	9.999102	8,808717	11,191283	19
8,809777	9,999094	8,812683	11,189317	18
8,811726	9,999086	8,812641	11,187359	17
8,813667	9 999077	8,814589	11,185411	16
8.815598	9,999069	8,816529	11,183471	15
8,817522	9,999061	8,818461	11,181539	14
8,819436	9,999052	8,820384	11,179616	13
8,821342	9 999044	8,822298	11,177702	12
8,823240	9,999036	8,824205	11,175795	11
8,825130	9,999927	8,826103	11,173897	10
8,827011	9,999019	8,827992	11,172008	9
8,828384	9,999010	8,829874	11,170126	8
8,830749	9,999072	8.831748	11,168252	7
8,832106	9 998993	8 833613	11 166387	6
8,834456	9,998984	8,835471	11,164529	5
8 836297	9,998976	8,837321	11,162679	4
8,838130	9.998967	8.839163	11,160837	3
8 839956	9.998958	8 840998	11,159002	2
8,841774	9,998940	8,842825	11,157175	1
8.843585	9 998941	8,844644	11,155356	0
Co-ſine	Sine	*Co-tang.*	Tangent	M

Degree 86.

	Degree 4.			
M	Sine	Co-ſine.	Tanget.	Co-tang.
0	8,843584	9,998941	8,844644	11,155356
1	8,845387	9,998931	8,846455	11,153545
2	8,847183	9,998923	8,848240	11,151740
3	8,848971	9,998914	8,850057	11,149943
4	8,850751	9,998905	8,851846	11,148154
5	8,852525	9,998896	8,853628	11,146372
6	8,854291	9,998887	8,855403	11,144597
7	8,856049	9,998878	8,857171	11,142829
8	8,857801	9,998869	8,858932	11,141068
9	8,859546	9,998860	8,860686	11,139314
10	8,861283	9,998851	8,862433	11,137567
11	8,863014	9,998841	8,864173	11,135827
12	8,864738	9,998832	8,865906	11,134094
13	8,866454	9,998823	8,867632	11,132368
14	8,868165	9,998813	8,869351	11,130649
15	8,869868	9,998804	8,871064	11,128936
16	8,871565	9,998795	8,872750	11,127230
17	8,873255	9,998785	8,874469	11,125531
18	8,874938	9,998776	8,876162	11,123838
19	8,876615	9,998766	8,877849	11,122151
20	8,878285	9,998757	8,879529	11,120471
21	8,879919	9,998747	8,881202	11,118798
22	8,881607	9,998738	8,882869	11,117131
23	8,883258	9,998728	8,884530	11,115470
24	8,884903	9,998718	8,886185	11,113815
25	8,886542	9,998708	8,887833	11,112167
26	8,888174	9,998699	8,889476	11,110524
27	8,889801	9,998689	8,891112	11,108888
28	8,891421	9,998679	8,892742	11,107258
29	8,893035	9,998669	8,894366	11,105634
30	8,894643	9,998659	8,845984	11,104016
31	8,896246	9,998649	8,897596	11,102404
32	8,897842	9,998639	8,899203	11,100797
33	8,899432	9,998629	8,900803	11,099197
34	8,901017	9,998619	8,902398	11,097602
35	8,902596	9,998609	8,903987	11,096013
36	8,904169	9,998599	8,905570	11,094430
37	8,905736	9,998589	8,907147	11,092853
38	8,907297	9,998577	8,908719	11,091281
39	8,908853	9,998568	8,910285	11,089715
40	8,910404	9,998558	8,911846	11,088154
41	8,911949	9,998548	8,913401	11,086599
42	8,913488	9,998537	8,914951	11,085049
43	8,915022	9,998527	8,916495	11,083505
44	8,916550	9,998516	8,918034	11,081966
45	8,918073	9,998506	8,919568	11,080432
46	8,919591	9,998495	8,921096	11,078904
47	8,921103	9,998485	8,922619	11,077381
48	8,922610	9,998474	8,924136	11,075864
49	8,924112	9,998464	8,925649	11,074351
50	8,925609	9,998453	8,927156	11,072844
51	8,927100	9,998442	8,928658	11,071342
52	8,928587	9,998431	8,930155	11,069845
53	8,930068	9,998421	8,931647	11,068353
54	8,931544	9,998410	8,933134	11,066866
55	8,933015	9,998399	8,934616	11,065384
56	8,934481	9,998388	8,936093	11,063907
57	8,935942	9,998377	8,937565	11,062435
58	8,937398	9,998366	8,939032	11,060968
59	8,938850	9,998355	8,940494	11,059506
60	8,940296	9,998344	8,941952	11,058048
	Co-ſine	Sine	Co-tang.	Tangent.
	Degree 85.			

Degree 5				
Sine	Co-ſine	Tanget.	Co-tang.	
8,940296	9,998344	8,941952	11,058048	60
8,941738	9,998333	8,943404	11,056596	59
8,943174	9,998322	8,944852	11,055148	58
8,944606	9,998311	8,946295	11,053705	57
8,946034	9,998300	8,947734	11,052266	56
8,957456	9,998289	8,949168	11,050832	55
8,958814	9,998277	8,950597	11,049403	54
8,950287	9,998266	8,952021	11,047979	53
8,951696	9,998255	8,953441	11,046559	52
8,953099	9,998243	8,954856	11,045144	51
8,954499	9,998232	8,956267	11,043733	50
8,955894	9,998220	8,957674	11,042326	49
8,957284	9,998209	8,959075	11,040925	48
8,958670	9,998197	8,960473	11,039527	47
8,960052	9,998186	8,961866	11,038134	46
8,961429	9,998174	8,963254	11,036746	45
8,962801	9,998163	8,964639	11,035361	44
8,964170	9,998151	8,966019	11,033981	43
8,965534	9,998139	8,967394	11,032606	42
8,966893	9,998128	8,968766	11,031234	41
8,968249	9,998106	8,970133	11,029867	40
8,969600	9,998104	8,971495	11,028505	39
8,970947	9,998092	8,972855	11,027145	38
8,972289	9,998080	8,974209	11,025791	37
8,973626	9,998068	8,975560	11,024440	36
8,974962	9,998056	8,976906	11,023094	35
8,976293	9,998044	8,978248	11,021752	34
8,977619	9,998032	8,979586	11,020414	33
8,978941	9,998020	8,980921	11,019079	32
8,980259	9,998008	8,982251	11,017749	31
8,981573	9,997996	8,983577	11,016423	30
8,982883	9,997984	8,984899	11,015101	29
8,984189	9,997971	8,986217	11,013783	28
8,985491	9,997959	8,987532	11,012468	27
8,986789	9,997947	8,988842	11,011158	26
8,988083	9,997935	8,990149	11,009851	25
8,989374	9,997922	8,991451	11,008549	24
8,990660	9,997910	8,992750	11,007250	23
8,991943	9,997897	8,994045	11,005955	22
8,993228	9,997885	8,995337	11,004663	21
8,994497	9,997873	8,996624	11,003376	20
8,995768	9,997860	8,997908	11,002092	19
8,997036	9,997847	8,999188	11,000812	18
8,998299	9,997835	9,000465	10,999535	17
8,999560	9,997822	9,001738	10,998262	16
8,000816	9,997809	9,003007	10,996993	15
9,002069	9,997797	9,004272	10,995728	14
9,003318	9,997784	9,005534	10,994466	13
9,004563	9,997771	9,006792	10,993208	12
9,005805	9,997758	9,008047	10,991953	11
9,007044	9,997732	9,009298	10,990702	10
9,008278	9,997732	9,010546	10,989454	9
9,009510	9,997719	9,011790	10,988210	8
9,010737	9,997706	9,013031	10,986969	7
9,011962	9,997693	9,014268	10,985732	6
9,013182	9,997680	9,015502	10,984498	5
9,014399	9,997667	9,016732	10,983268	4
9,015613	9,997654	9,017959	10,982041	3
9,016824	9,997641	9,019183	10,980817	2
9,018031	9,997628	9,020403	10,979597	1
9,019235	9,997614	9,021620	10,978380	0
Co-ſine	Sine	Co-tang.	Tangent,	M
Degree 84.				

Degree 6.

M	Sine	*Co-ſine.*	Tanget,	*Co-tang.*
0	9,019235	9,997614	9,021620	10,978380
1	9,020435	9,997601	9,022834	10,977166
2	9,021632	9,997588	9,024044	10,975956
3	9,022825	9,997574	9,025251	10,974749
4	9,024016	9,997561	9,026455	10,973545
5	9,025203	9,997548	9,027655	10,972345
6	9,026386	9,997534	9,028852	10,971148
7	9,027567	9,997520	9,030046	10,969954
8	9,028744	9,997507	9,031237	10,968763
9	9,029918	9,997493	9,032425	10,967575
10	9,031089	9,997480	9,033609	10,966391
11	9,032257	9,997466	9,034791	10,965209
12	9,033421	9,997452	9,035969	10,964031
13	3,034582	9,997439	9,037144	10,962856
14	9,035741	9,997425	9,038316	10,961684
15	9,036896	9,997411	9,039485	10,960515
16	9,038048	9,997397	9,040651	10,959349
17	9,039197	9,997383	9,041813	10,958187
18	9,040342	9,997369	9,042973	10,957027
19	9,041485	9,997355	9,044130	10,955870
20	9,042625	9,997341	9,045284	10,954716
21	9,043762	9,997327	9,046434	10,953566
22	9,044895	9,997313	9,047582	10,952418
23	9,046026	9,997299	9,048727	10,951273
24	9,047154	9,997285	9,049869	10,950131
25	9,048279	9,997271	9,051008	10,948992
26	9,049400	9,997256	9,052144	10,947856
27	9,050519	9,997242	9,053277	10,946723
28	9,051635	9,997228	9,054408	10,945592
29	9,052749	9,997214	9,055535	10,944465
30	9,053859	9,997199	9,056640	10,943340
31	9,054966	9,997185	9,057781	10,942219
32	9,056071	9,997170	9,058900	10,941100
33	9,057172	9,997156	9,060016	10,939984
34	9,058271	9,997141	9,061130	10,938870
35	9,059367	9,997127	9,092240	10,937760
36	9,060460	9,997112	9,063348	10,936652
37	9,061551	9,997098	9,064453	10,935547
38	9,062638	9,997083	9,065556	10,934444
39	9,063723	9,997068	9,066655	10,933345
40	9,064806	9,997053	9 067752	10,932248
41	9,065885	9,997039	9,068847	10,931153
42	9,066962	9.997024	9,069938	10,930062
43	9,068036	9,997009	9,071027	10,928973
44	9,069107	9 996994	9,072113	10,927887
45	9 070176	9.996979	9 073197	10,926803
46	9,071242	9 996964	9,074278	10,925722
47	9,072306	9 996949	9,075356	10,924644
48	9,073366	9,996934	9,076432	10 923568
49	9,074424	9 996919	9,077505	10,922495
50	9,075480	9,996904	9,078576	10,921424
51	9,076533	9,996889	9.079644	10,920356
52	9,077583	9 996874	9,080710	10,919290
53	9,078631	9,996858	9,081773	10,918227
54	9,079676	9,996843	9,082833	10,917167
55	9,080719	9,996828	9,083891	10.916109
56	9,081759	9,996812	9,084947	10,915053
57	9,082797	9,996797	9,085999	10 914000
58	9,083832	9,996782	9,087050	10,912950
59	9,084864	9 996766	9,088098	10,911902
60	9,085894	9.996751	9,089144	10,910856
	Co-ſine	Sine	*Co-tang.*	Tangent

Degree 83.

Degree 7.

Sine	*Co-ſine*	Tanget.	*Co-tang.*	
9,085894	9,996751	9,089144	10,910856	60
9,086922	9,996735	9,090187	10,909813	59
9,087947	9,996720	9,091228	10,908772	58
9,088970	9,996704	9,092266	10,907734	57
9,089990	9,996688	9,093302	10,906698	56
9,091088	9,996673	9,094336	10,905664	55
9,092024	9,996657	9,095367	10,904633	54
9,093037	9,996641	9,096395	10,903604	53
9,094047	9,996625	9,097422	10,902578	52
9,095056	9,996610	9,098446	10,901554	51
9,096062	9,996594	9,099468	10,900532	50
9,097065	9,996578	9,100487	10,899513	49
9,098066	9,996562	9,101504	10,898496	48
9,099065	9,996546	9,102519	10,897481	47
9,100062	9,996530	9,103532	10,896468	46
9,101056	9,996514	9,104542	10,895458	45
9,102048	9,996498	9,105550	10,894450	44
9,103037	9,996482	9,106556	10,893444	43
9,104025	9,996465	9,107559	10,892441	42
9,105010	9,996449	9,108560	10,891440	41
9,105992	9,996433	9,109559	10,890441	40
9,106973	9,996417	9,110556	[illegible]89444	39
9,107951	9,996400	9,111551	10,888449	38
9,108927	9,996384	9,112543	10,887457	37
9,109901	9,996368	9,113533	10,886467	36
9,110873	9,996351	9,114521	10,885478	35
9,111842	9,996335	9,115507	10,884493	34
9,112809	9,996318	9,116491	10,883509	33
9,113774	9,996302	9,117472	10,882528	32
9,114737	9,996285	9,118452	10,881548	31
9,115698	9,996269	9,119429	10,880571	30
9,116656	9,996252	9,120404	10,879596	29
9,117612	9,996235	9,121377	10,878623	28
9,118567	9,996218	9,122348	10,877652	27
9,119519	9,996202	9,123317	10,876683	26
9,120469	9,996185	9,124284	10,875716	25
9,121417	9,996168	9,125248	10,874751	24
9,122362	9,996151	9,126211	10,873789	23
9,123306	9,996134	9,127172	10,872828	22
9,124248	9,996117	9,128130	10,871870	21
9,125187	9,996100	9,129087	10,870913	20
9,126125	9,996083	9,130041	10,869959	19
9,127060	9,996066	9,130994	10,869006	18
9,127993	9,996049	9,131944	10,868056	17
9,128925	9 996032	9,132893	10,867107	16
9,129854	9,996015	9,133839	10.866161	15
9,130781	9,995998	9,134784	10,865216	14
9,131706	9 995980	9,135726	10,864274	13
9,132630	9,995963	9,136666	10,863334	12
9 133551	9,995946	9,137605	10,862395	11
9,134470	9,995928	9,138542	10,861458	10
9,135387	9,995911	9,139476	10,860524	9
9,136303	9,995894	9,140409	10,859591	8
9,137216	9,995876	9,141340	10,858660	7
9,138127	9,995859	9,142269	10,857731	6
9,139037	9,995841	9,143196	10,856804	5
9,139944	9,995825	9,144121	10,855879	4
9,140850	9,995806	9,145044	10.854956	3
9,141754	9,995788	9,145965	10,854035	2
9,142655	9.995770	9,146885	10,853115	1
9,142555	9,995753	9,147803	10 852197	0
Co-ſine	Sine	*Co-tang.*	Tangent	M

Degree 82.

Degree 8.

M	Sine	*Co-ſine.*	Tanget.	*Co-tang.*
0	9,143555	9,995753	9,147803	10,852197
1	9,144453	9,995735	9,148718	10,851282
2	9,145349	9,995717	9,149632	10,850368
3	9,146243	9,995699	9,159544	10,849456
4	9,147136	9,995681	9,151454	10,848546
5	9,148026	9,995664	9,152363	10,847637
6	9,148915	9,995646	9,153269	10,846731
7	9,149801	9,995628	9,154174	10,845825
8	9,150686	9,995610	9,155077	10,844923
9	9,151569	9,995591	9,155978	10,844022
10	9,152451	9,995573	9,156877	10,843123
11	9,153330	9,995555	9,157775	10,842225
12	9,154208	9,995537	9,158671	10,841329
13	9,155082	9,995519	9,159565	10,840435
14	9,155957	9,995501	9,160457	10,839543
15	9,156830	9,995482	9,161347	10,838653
16	9,157700	9,995464	9,162236	10,837764
17	9,158569	9,995446	9,163123	10,836877
18	9,159436	9,995427	9,164008	10,835992
19	9,160301	9,995409	9,164892	10,835108
20	9,161164	9,995390	9,165773	10,834226
21	9,162025	9,995372	9,166654	10,833346
22	9,162885	9,995353	9,167532	10,832468
23	9,163743	9,995334	9,168409	10,831591
24	9,164600	9,995316	9,169284	10,830716
25	9,165454	9,995297	9,170157	10,829843
26	9,166307	9,995278	9,171029	10,828971
27	9,167158	9,995260	9,171899	10,828101
28	9,168008	9,995241	9,172767	10,827233
29	9,168856	9,995222	9,173634	10,826366
30	9,169702	9,995203	9,174499	10,825501
31	9,170546	9,995184	9,175362	10,824638
32	9,171389	9,995165	9,176224	10,823776
33	9,172230	9,995146	9,177084	10,822916
34	9,173070	9,995127	9,177942	10,822057
35	9,173908	9,995108	9,178799	10,821201
36	9,174744	9,995089	9,179655	10,820345
37	9,175578	9,995070	9,180508	10,819492
38	9,176411	9,995061	9,181360	10,818640
39	9,177242	9,996032	9,182211	10,817789
40	9,178072	9,995012	9,183060	10,816940
41	9,178900	9,994993	9,183907	10,816093
42	9,179726	9,994974	9,184752	10,815248
43	9,180551	9,994955	9,185597	10,814403
44	9,181374	9,994935	9,186439	10,813561
45	9,182196	9,994916	9,147280	10,812720
46	9,183016	9,994896	9,188120	10,811880
47	9,183834	9,994876	9,188957	10,811042
48	9,184651	9,994857	9,189794	10,810206
49	9,185466	9,994838	9,190629	10,809371
50	9,186280	9 994818	9,191462	10,808538
51	9,187092	9,994798	9,192294	10,807706
52	9,187903	9,994779	9,193124	10,806876
53	9,188712	9,994759	9,193953	10,806047
54	9,189519	9,994739	9,194780	10,805220
55	9,190325	9,994719	9,195606	10,804394
56	9,191130	9,994699	9,196440	10,803569
57	9,191933	9,994680	9,197253	10,802747
58	9,192734	9,994660	9,198674	10,801926
59	9,193534	9,994640	9,198894	10,801106
60	9,194332	9,994620	9,199712	10,800287
	Co-ſine	Sine	*Co-tang.*	Tangent.

Degree 81.

Degree 9

Sine	*Co-ſine*	Tanget.	*Co-tang.*	
9,194332	9,994620	9,199712	10,800287	60
9,195129	9,994600	9,200529	10,799470	59
9,195925	9,994580	9,201345	10,798655	58
9,196718	9,994560	9,202159	10,797841	57
9,197511	9,994540	9,202971	10,797029	56
9,198302	9,994519	9,203782	10,796218	55
9,199091	9,994499	9,204592	10,795408	54
9,199879	9,994479	9,205400	10,794600	53
9,200666	9,994459	9,206207	10,793793	52
9,201451	9,994438	9,207013	10,792987	51
9,202234	9,994418	9,207817	10,792183	50
9,203017	9,994398	9,208619	10,791381	49
9,203797	9,994377	9,209420	10,790580	48
9,204577	9,994357	9,210220	10,789780	47
9,205354	9,994336	9,211018	10,788982	46
9,206131	9,964316	9,211815	10,788185	45
9,206906	9,994295	9,212611	10,787389	44
9,267679	9,994274	9,213405	10,786595	43
9,208452	9,994254	9,214198	10,785802	42
9,209222	9,994233	9,214989	10,785011	41
9,209992	9,994212	9,215780	10,784220	40
9,210760	9,994191	9,216568	10,783432	39
9,211526	9,994171	9,217356	10,782644	38
9,212291	9,994150	9,218142	10,781858	37
9,213055	9,994129	9,218926	10,781074	36
9,213818	9,994108	9,219710	10,780290	35
9,214579	9,994087	9,220491	10,779508	34
9,215338	9,994066	9,221272	10,778728	33
9,216097	9,994044	9,222052	10,777948	32
9,216854	9,994024	9,222830	10,777170	31
9,217609	9,994003	9,223607	10,716393	30
9,218363	9,993982	9,224382	10,775618	29
9,219116	9,993960	9,225156	10,774844	28
9,219868	9,993939	9,225929	10,774071	27
9,220618	9,993918	9,226704	10,773300	26
9,221367	9,993897	9,227471	10,772529	25
9,222115	9,993875	9,228240	10,771760	24
9,222861	9,993854	9,229007	10,770993	23
9,223606	9,993832	9,229774	10,770226	22
9,224349	9,993811	9,230539	10,769461	21
9,225092	9,993789	9,231302	10,768698	20
9,225833	9,993768	9,232065	10,767935	19
9,226573	9,993746	9,232826	10,767174	18
9,227311	9,993725	9,233586	10,766414	17
9,228048	9,993703	9,234345	10,765655	16
9 228784	9,993681	9,235103	10,764897	15
9,239518	9,993660	9,235859	10,764141	14
9,230252	9,993638	9,236614	10,763386	13
9,230984	9,993616	9,237368	10,762632	12
9,221715	9 993594	9,238120	10,761880	11
9,232444	9,693572	9,238872	10,761128	10
9,133172	9,993550	9,239622	10,760378	9
9,233899	9,993528	9,240371	10,759629	8
9,234625	9,993506	9,241118	10,758882	7
9,235349	9,993484	9,241865	10,758135	6
9,236073	0,993462	9,242610	10,757390	5
9,236795	9 993440	9,243354	10,756646	4
9,237515	9,993418	9 244097	10,755903	3
9,238835	9,993396	9,244839	10,755161	2
9,238952	9,993374	9,245579	10,754421	1
9,239670	9,993351	9,246319	10,753681	0
Co-ſine	Sine	*Co-tang.*	Tangent.	M

Degree 80.

Degree 10.				
M	Sine	*Co-sine.*	Tangent,	*Co-tang*
0	9,239670	9,993351	9,246319	10,753681
1	9,240386	9,993329	9,247057	10,752943
2	9,241101	9,993307	9,247794	10,752206
3	9,241814	9,993284	9,248530	10,751470
4	9,242526	9,993262	9,249264	10.750736
5	9,243237	9,993240	9,249998	10,750002
6	9,243947	9,993117	9,250730	10,749270
7	9,244656	9 993195	9,251461	10,748539
8	9,245363	9 993172	9,252191	10,747809
9	9,246070	9,993149	9,252920	10,747080
10	9,246775	9,993127	9,253648	10,746352
11	9,247478	9,993104	9,254374	10,745626
12	9,248181	9,993011	9,255200	10,744900
13	9,248883	9.993059	9,255824	10,744176
14	9,249583	9 993036	9 256547	10,743453
15	9,250282	9,993013	9,257269	10,742731
16	9,250980	9,992990	9,257990	10,742010
17	9,251677	9,992967	9,258710	10,741290
18	9,252373	9,992944	9,259429	10,740571
19	9 253067	9,992921	9,260146	10,739854
20	9,253761	9,992898	9,260863	10,739137
21	9,254453	9,992875	9,261578	10,738422
22	9,255144	9,992852	9 262292	10,737708
23	9,255834	9,992829	9,263005	10,736995
24	9,256523	9,992806	9 263717	10,736283
25	9,257211	9 992783	9,264428	10,735572
26	9,257898	9,992759	9,265138	10,734862
27	9,258583	9,992736	9.265847	10,734153
28	9,259268	9,992713	9,266555	17,733445
29	9,259951	9,992690	9,267261	10 732739
30	9,260633	9,992666	9,267967	10,732033
31	9,261314	9,992643	9,268671	10,731329
32	9,261994	9,992619	9,269375	10,730625
33	9,262673	9,992596	9.270778	10 729923
34	9,263351	9,992572	9,270779	10,729221
35	9,264027	9 992549	9,271479	10,728521
36	9,264703	9,992525	9,272178	10,727822
37	9,265378	9,992501	9,272876	10,727124
38	9,266051	9 992478	9,273573	10,726427
39	9,266723	9,992454	9,274269	10,725731
40	9,267395	9,992430	5,274964	10 725036
41	9,268065	9,992406	9,275658	10,724342
42	9,268734	9,992382	9,276351	10,723649
43	9,269402	9,992362	9,277043	10,722957
44	9,270069	9,992335	9,277734	10 722267
45	9,270735	9 992311	9,278424	10 721576
46	9,271400	9 992287	9,279113	10,720887
47	9,272063	9,992263	9,279801	10,720199
48	9,272726	9,992239	9,280488	10,719512
49	9,273388	9,992214	9 281174	10,718826
50	9,274049	9,992190	9,281858	10,718142
51	9,274708	9,992166	9,282542	10,717458
52	9,275367	9,992142	9,283225	10,716775
53	9,276025	9,992118	9,283907	10,716093
54	9,276681	9,992093	9,284588	10,715412
55	9,277337	9,992069	9,285268	10,714732
56	9,277991	9,992045	9,285946	10,714053
57	9,278685	9,992020	9,286624	10,713376
58	9,279297	9,991996	9,287301	10,712699
59	9,279948	9,991971	9,287977	10,712023
60	9,280599	9,991947	9,288652	10,711348
	Co-sine	Sine	*Co-tang.*	Tangent
	Degree 79.			

Degree 11.				
Sine	*Co-sine*	Tangent.	*Co-tang.*	
9,280599	9,991947	9,288652	10,711348	60
9,281229	9,991922	9,289326	10,710674	59
9,281897	9,991897	9,289999	10,710001	58
9,282544	9 991873	9,290671	10,709329	57
9,283190	9,991848	9,291342	10,708658	56
9,283836	9,991823	9,292013	10,707987	55
9,284480	9,991799	9,292682	10,707318	54
9,285124	9,991774	9,293350	10,706650	53
9,285766	9,991749	9,294017	10,705983	52
9,286408	9,991724	9,294684	10,705316	51
9,287048	9,991699	9,295349	10,704651	50
9,287688	9,991674	9,296013	10,703987	49
9,288326	9,991649	9,296677	10,703323	48
9,288964	9,991624	9,297339	10,702661	47
9,289600	9,991599	9,298001	10,701999	46
9,290236	9,991574	9,298662	10,701338	45
9,290870	9,991549	9,299322	10,700678	44
9,291504	9,991524	9,299980	10,700020	43
9,292137	9,991498	9,300638	10,699362	42
9,292768	9,991473	9,301295	10,698705	41
9,293399	9,991448	9,301951	10,698049	40
9,294029	9,991422	9,302607	10,697393	39
9,294658	9,991397	9,303261	10,696739	38
9,295286	9,991372	9,303914	10,696086	37
9,295913	9,991346	9,304567	10,695433	36
9,296539	9,991321	9,305218	10,694782	35
9,297164	9,991295	9,305867	10,694131	34
9,297788	9,991270	9,306519	10,693481	33
9,298412	9,991244	9,307168	10,692832	32
9,299034	9,991218	9,307816	10,692184	31
9,299655	9,991193	9,308463	10,691537	30
9,300276	9,991167	9,309109	10,690891	29
9,300895	9,991141	9,309754	10,690246	28
9.301514	9,991115	9,310399	10,689601	27
9,302132	9,991090	9,311042	10,688958	26
9,302749	9,991064	9,311685	10,688315	25
9,303364	9,991038	9,312327	10,687673	24
9,303979	9,991012	9,312968	10,687032	23
9 304593	9,990986	9,313608	10,686392	22
9,305207	9,990960	9,314247	10,685753	21
9,305819	9 990934	9,314885	10,685115	20
9,306430	9,990908	9,315523	10,684477	19
9,307041	9,990882	9,316159	10,683841	18
9,307650	9,990855	9,316795	10,683205	17
9,308259	9,990829	9,317430	10,682570	16
9,308867	9,990803	9,318064	10,681936	15
9,309474	9,990777	9,318697	10,681303	14
9,310080	9,990750	9,319330	10,680670	13
9,310685	9,990724	9,319961	10,680039	12
9,311289	9,990697	9,320592	10,679408	11
9,311899	9,990671	9,321222	10,678778	10
9,312495	9,990645	9,321851	10,678149	9
9,313097	9,990618	9,322479	10,677521	8
9,313698	9,990591	9,323106	10,676894	7
9,314297	9,990565	9,323733	10,676267	6
9,314897	9,990538	9,324358	10,675642	5
9.315495	9,990512	9,324983	10,675017	4
9,316092	9,990485	9,325607	10,674393	3
9,316689	9 990458	9,326231	10,673769	2
9,317284	9,990431	9,326853	10,673147	1
9,317879	9,990404	9,327475	10,672525	0
Co-sine	Sine	*Co-tang.*	Tangent	M
Degree 78.				

×
9.270779

	Degree 12.				Degree 13				
M	Sine	*Co-ſine.*	Tangĕt.	*Co-tang.*	Sine	*Co-ſine*	Tangĕt.	*Co-tang.*	
0	9,317879	9,990404	9,327475	10,672525	9,352088	9,988724	9,363364	10,636636	60
1	9,318473	9,990377	9,328095	10,671905	9,352635	9,988695	9,363940	10,636060	59
2	9,319066	9,990351	9,328715	10,671285	9,353181	9,988666	9,364515	10,635485	58
3	9,319658	9,990324	9,329334	10,670666	9,353726	9,988636	9,365090	10,634910	57
4	9,320250	9,990297	9,329953	10,670047	9,354271	9,988607	9,365664	10,634336	56
5	9,320840	9,990270	9,320570	10,669430	9,354185	9,988578	9,366237	10,633763	55
6	9,321430	9,990242	9.331187	10,668813	9,355358	9,988548	9,366810	10,633190	54
7	9,322019	9,990215	9,331803	10,668197	9,355901	9,988519	9,367382	10,632618	53
8	9,322607	9·990188	9,332418	10,667582	9,356443	9,988489	9,367953	10,632047	52
9	9,323194	9,990161	9,333033	10,666967	9,356984	9,988460	9,368524	10,631476	51
10	9,323780	9,990134	9,333646	10,666354	9,357524	9,988430	9,369094	10,630906	50
11	9,324366	9,990107	9,334259	10,665741	9,358064	9,988401	9,369663	10.630337	49
12	9,324950	9,990079	9,334871	10,665129	9,358603	9,988371	9,370232	10,629768	48
13	9,325534	9,990052	9,335482	10,664518	9,359141	9,988341	9,370799	10,629201	47
14	9,326117	9,990025	9,336093	10,663907	9,359679	9,988312	9,371367	10,628633	46
15	9,326699	9,989997	9,336702	10,663298	9,350215	9,988282	9,371933	10,628067	45
16	9,327281	9,989970	9,337311	10,662689	9,360752	9,988252	9,372499	10,627501	44
17	9,327862	9,989942	9,337919	10,662081	9,361287	9·988223	9,373064	10,626936	43
18	9,328441	9 989915	9,338527	10,661473	9,361822	9,988193	9,373629	10,626371	42
19	9 329020	9,989887	9,339133	10,660867	9,362356	9,988163	9,374193	10,625807	41
20	9,329599	9,989860	9,339739	10,660261	9,362889	9,988133	9,374756	10,625244	40
21	9,330176	9,989832	9,340344	10,659656	9,363422	9,988103	9,375319	10,624681	39
22	9,330753	9,989804	9 340948	10,659052	9,363954	9,988073	9,375881	10,624119	38
23	9,331328	9,989777	9,341552	10,658448	9 364485	9,988043	9,376442	10,623558	37
24	9,331903	9 989749	9,342155	10,657845	9,365016	9,988013	9,377003	10,622997	36
25	9,332478	9,989721	9,342757	10,657243	9,365546	9,987983	9,377563	10,622437	35
26	9,333051	9,989693	9,343358	10,656642	9,366075	9,987953	9,378122	10,621878	34
27	9,333624	9,989665	9,343958	10,656042	9,366604	9,987922	9,378681	10,621319	33
28	9,334195	9,989637	9,344558	10,655442	9,367132	9,987892	9,379239	10,620761	32
29	9,334766	9,989609	9,345157	10,654843	9,367659	9,987862	9,379797	10,620203	31
30	9,335337	9 989581	9,345755	10,654245	9,368185	9,987832	9,380354	10,619646	30
31	9,335906	9,989553	9,346353	10,653647	9,368711	9,987801	9,380910	10,619090	29
32	9,336475	9,989525	9 346949	10,653051	9,369236	9,987771	9,381466	10,618534	28
33	9,337043	9,989597	9,347545	10,652455	9,369761	9,987740	9,382021	10,617980	27
34	9.337610	9.989469	9,348141	10 651859	9,370285	9 987710	9,382575	10,617425	26
35	9,338176	9,989441	9,348735	10,651265	9,370808	9,987679	9,383129	10,616871	25
36	9,338742	9 989413	9,349329	10,650671	9,371330	9,987649	9 383682	10,616318	24
37	9,339306	9,989384	9,349922	10 650078	9,371852	9,987618	9,384234	10,615766	23
38	9,339870	9,989356	9,350514	10,649486	9,372373	9,987588	9,384786	10,615214	22
39	9,340434	9,989328	9,351106	10,648894	9,372894	9 987557	9,385337	10,614663	21
40	9,340996	9,989299	9 351697	10,648303	9,373414	9,987526	9,385888	10,614112	20
41	9,341558	9,989271	9,352287	10,647713	9,373933	9·987496	9,386438	10,613562	19
42	9,342119	9 ,989243	9,352876	10,647124	9 374452	9 987465	9,386987	10,613013	18
43	9 342679	9,989214	9.353465	10,646535	9,374970	9.987434	9,387536	10,612464	17
44	9,343239	9,989186	9,354053	16,645947	9,375487	9,987403	9,388084	10.611916	16
45	9,343797	9,989157	9,354640	10 645360	9,376003	9,987372	9,388631	10,611369	15
46	9,344355	9,989128	9,355227	10,644773	9,376519	9,987341	9,389178	10,610822	14
47	9·344912	9,989100	9 355812	10,644187	9,377035	9,987310	9 389724	10,610276	13
48	9 345469	9.989071	9 356398	10,643602	9,377549	9,987279	9,390270	10,609730	12
49	9·346024	9,989042	9,356982	10,643018	9 378063	9·987248	9,390815	10,609185	11
50	9,346579	9,989014	9.357566	10,642434	9,378577	9,987217	9,391360	10,608640	10
51	9,347134	9,988985	9,358149	10,641851	9,379089	9,987186	9,391907	10,608097	9
52	9,347687	9,988956	9,358731	10,641269	9,379601	9,987155	9 392467	10,607553	8
53	9,348240	9,988927	9,359313	10,640687	9,380113	9,987124	9,392989	10,607011	7
54	9,348792	9.988898	9,359893	10,640107	9,380624	9,987092	9.393531	10 606469	6
55	9,349343	9,988869	9,360474	16,639526	9,381134	9,987061	9,394074	10,605927	5
56	9,349893	9,988840	9,361053	10,638947	9,381643	9,987030	9,394614	10.605386	4
57	9,350443	9,988811	9,361632	10,638368	9.382152	9,986998	9,395154	10,604846	3
58	9,350992	9,988782	9,362210	10,637790	9,382661	9 986967	9.395694	10,604306	2
59	9,351540	9,988754	9,362787	10,637213	9,383168	9.986936	9,396233	10,603767	1
60	9,352088	9,988724	9,363364	10,636636	9,383675	9,986904	9,396771	10,603229	0
	Co-ſine	Sine	*Co-tang.*	Tangent.	*Co-ſine*	Sine	*Co-tang.*	Tangent,	M
	Degree 77.				Degree 76.				

Degree 14.

M	Sine	*Co-ſine.*	Tanget,	*Co-tang*
0	9,383675	9,986904	9,396771	10,603229
1	9,384181	9,986873	9,397309	10,602694
2	9,384687	9,986841	9,397846	10,602154
3	9,385192	9,986809	9,398383	10,601617
4	9,385697	9,986778	9,398919	10,601081
5	9,386201	9,986746	9,399455	10,600545
6	9,386704	9,986714	9,399990	10,600010
7	9,387207	9,986683	9,400524	10,599476
8	9,387709	9,986651	9,401058	10,598942
9	9,388210	9,986619	9,401591	10,598409
10	9,388711	9,986587	9,402124	10,597876
11	9,389211	9,986555	9,402656	10,597344
12	9 389711	9,986523	9,403187	10,596813
13	9,390210	9,986491	9,403718	10,596282
14	9,390708	9,986459	9,404249	10,595751
15	9,391206	9,986427	9,404778	17,595222
16	9,391703	9,986395	9,405306	10,594692
17	9,392199	9,986363	9,405836	10,594164
18	9,392695	9,986331	9,406364	10,593636
19	9,393190	9,986299	9,406892	10,593608
20	9,393685	9,986266	9,407419	10,592581
21	9,394179	9,986234	9,407945	10,592055
22	6,394673	9,986201	9,408471	10,591529
23	9,395166	9,986169	9,408996	10,591001
24	9,395654	9,986137	9,409521	10,590479
25	9,396150	9,986104	9,410045	10,589954
26	9,396641	9,986072	9,410569	10,589431
27	9,397131	9,986039	9,411092	10,588908
28	9,397621	9,986007	9,411615	10,588385
29	9,398111	9,985974	9,412137	10,587863
30	9,398600	9,985942	9,412658	10,587342
31	9,399087	9,985909	9,413179	10,586821
32	9,399575	9,985876	9,413699	10,586301
33	9,400062	9,985843	9,414219	10,585781
34	9,400549	9,985811	9,414738	10,585262
35	9,401035	9,985778	9,415257	10,584742
36	9,401520	9,985745	9,415775	10,584225
37	9,402005	9,985712	9,416293	10,583707
38	9,402489	9,985679	9,416810	10,583190
39	9,402972	9,985646	9,417326	10,582674
40	9,403455	2,985613	9,417842	10,582157
41	9,403938	9,985580	9,418357	10,581642
42	9,404420	9,985547	9,418873	10,581127
43	9,404901	9,985513	9,419387	10,580613
44	9,405382	9,985480	9,419901	10,580099
45	9,405862	9,985447	9,420415	10,579585
46	9,406341	9 985414	9,420927	10,579072
47	9,406820	9 985380	9,421440	10,578560
48	9,407299	9 985347	9,421951	10,578048
49	9,407776	9,985314	9,422463	10,577537
50	9,408254	9,985280	9,422973	10,577026
51	9,408731	9,985247	9,423484	10,576516
52	9,409207	9,985213	9,423993	10,576007
53	9,409682	9,985180	9,424503	10,575497
54	2,410157	9,985146	9,425011	10,574989
55	9,410632	9,985112	9,425518	10,574480
56	9,411106	9,985079	9,426027	10,573973
57	9,411579	9,985045	9,426534	10,573466
58	9,412052	9,985011	9,427041	10,572959
59	9,412524	9,984977	9 427547	10,572453
60	9,412996	9,984943	9,428052	10,571947
	Co-ſine	Sine	*Co-tang.*	Tangent

Degree 75.

Degree 15.

Sine	*Co-ſine*	Tanget.	*Co-tang.*	
9,412996	9,984944	9,428052	10,571947	60
9,413467	9,984910	9,428557	10,571442	59
9,413938	9,984876	9,429062	10,570938	58
9,414408	9,984842	9,429566	10,570434	57
9,414878	9,984808	9,420070	10,579930	56
9,415347	9,984774	9,420573	10,579427	55
9,415815	9,984740	9,431075	10,568925	54
9,416283	9,984706	9,431577	10 568423	53
9,416850	9,984672	9,432079	10,567921	52
9,417217	9,984637	9,432580	10,567420	51
9,417684	9,984603	9,433080	10,566920	50
9,418149	9,984569	9,433580	10,566419	49
9,418615	9,984535	9,434080	10,565920	48
9,419079	9,984500	9,434579	10,565421	47
9,419544	9,984466	9,435078	10,564922	46
9,420027	9,984431	9,435576	10,564424	45
9,420470	9,984397	9,436073	10,563927	44
9,420933	9 984363	9,436570	10,563430	43
9,421395	9,984328	9,437067	10,562933	42
9,421856	9,984293	9,437563	10,562437	41
9,422317	9,984259	9,438059	10,561941	40
9,422778	9,984224	9,438554	10,561446	31
9,423238	9,984189	9,439548	10,560952	38
9,423697	9,984155	9,439543	10,560457	37
9,424156	9,984120	9,440036	10,559964	36
9,424615	9,984085	9,440529	10,559471	35
9,425072	9,984050	9,441022	10,558978	34
9,425530	9,984015	9,441514	10,558486	33
9,425987	9,983980	9,442006	10,557994	32
9,426443	9,983945	9,442497	10,557503	31
9,426899	9,983910	9,442988	10,557011	30
9,427354	9,983875	9,443479	10,556521	29
9,427809	9,983840	9,443968	10,556031	28
9,428264	9,983805	9,444458	10,555542	27
9,428717	9,983770	9,444947	10,555053	26
9,429170	9,983735	9,445435	10,554565	25
9,429623	9,983699	9,445923	10,554077	24
9,430075	9,983664	9,446411	10,553589	23
9,430507	9,983629	9,446898	10,553102	22
9,430978	9,983593	9,447384	10,552616	21
9,431429	9,983558	9,447870	10,552129	20
9,431879	9,983523	9,448356	10,551644	19
9,432328	9,983487	9,448841	10,551159	18
9,432778	9,983452	9,449326	10,550674	17
9,433206	9,983416	9,449810	10,550181	16
9,433674	9,983380	9,450294	10,559706	15
9,434122	9,983345	9,450777	10,549223	14
9,434569	9,983309	9,451260	10,548740	13
9,435016	9,983273	9,451743	10,548257	12
9,435462	9,983238	9,452225	10,547775	11
9,435918	9,983202	9,452706	10,547294	10
9,436353	9,983166	9,453187	10,546813	9
9,436798	2,983130	9,453668	10,546332	8
9,437242	9,983094	9,454148	10,145852	7
9,437686	9,983058	9,454629	10,545372	6
9,438129	9,983022	9 455107	10,544893	5
9,438572	9,982986	9 455586	10,544414	4
9,439014	9,982950	9,456064	10 543936	3
9,439456	9,982914	9,456542	10,543458	2
9,439897	9,982878	9,457019	10,542980	1
9,440338	9,982842	9,457496	10,542503	0
Co-ſine	Sine	*Co-tang.*	Tangent	M

Degree 4.

Degree 16.				
M	Sine	*Co-ſine.*	Tanget,	*Co-tang.*
0	9,440338	9 982842	9,457496	10,542503
1	9,440778	9,982805	9,457973	10,542027
2	9,441218	9,982769	9,458449	10,541551
3	9,441658	9,982733	9,458925	10 541075
4	9,442096	9,982696	9,459400	10,540600
5	9,442535	9,982660	9,459875	10,540125
6	9,442973	9,982623	9,460349	10,539651
7	9,443416	9,982587	9,460829	10,539177
8	9,443848	9,982550	9,461297	10,538703
9	9,444284	9,982514	9,461770	10,538230
10	9,444720	9,982477	9,462242	10,537758
11	9,445155	9,982441	9,462714	10,537285
12	9,445590	9,982404	9,463186	10,536814
13	9,446025	9,982367	9,463658	10,536342
14	9,446459	9,982330	9,464129	10,535871
15	9,446893	9,982294	9,464599	10,535401
16	9,447326	9,982257	9,465069	10,534931
17	9,447759	9,982220	9,465539	10,534461
18	9,448191	9,982183	9 466008	10,533992
19	9,448623	9,982146	9,466476	10,533523
20	9,449054	9,982109	9,466945	10,533055
21	9,449485	9,982072	9,467413	10,532587
22	9,449915	9,982035	9,467880	10,532120
23	9,450345	9,981998	9,468347	10,531653
24	9,450775	9,981961	9,468814	10,531186
25	9,451203	9,981923	9,469280	10,530720
26	9,451632	9,981886	9,469746	10,530254
27	9,452060	9,981849	9,470211	10,529789
28	9,452488	9,981812	9,470676	10,529324
29	9,452915	9,981774	9,471141	10,528859
30	9,453342	9,981737	9,471605	10,528395
31	9,453768	9,981699	9,472068	10,527931
32	9,454194	9,981662	9,472532	10,527468
33	9,454619	9,981624	9,472995	10,527005
34	9,455044	9,981587	9,473457	10,526543
35	9,455469	9,981549	9,473919	10,526081
36	9,455892	9 981512	9,474381	10,525619
37	9,456316	9,981474	9,474842	10,525158
38	9,456739	9,981436	9,475303	10,524695
39	9,457162	9,981398	9,475763	10,524237
40	9,457584	9,981361	9,476223	10,523777
41	9,458006	9,981323	9,476683	10,523317
42	9,458427	9,981285	9,477142	10,522858
43	9,458848	9,981247	9,477601	10,522399
44	9,459268	9,981209	9 478059	10,521941
45	9,459684	9,981171	9,478517	10,521483
46	9,460108	9 981133	9 478975	10,521025
47	9,460527	9,981095	9 479432	10,520568
48	9,460946	9,981057	9,479889	10,520111
49	9,461364	9,981019	9,480345	10,519655
50	9,461782	9,980980	9,480801	10,519199
51	9,462199	9,980942	9,481257	10,518743
52	9,462616	9,980904	9,481712	10,518288
53	9,463032	9,980866	9,482167	10,517833
54	9,463448	9,980827	9,482621	10,517379
55	9,463864	9,980789	9,483075	10,516925
56	9,464279	9,980750	9,483528	10,516471
57	9,464694	9,980712	9,483982	10,516018
58	9,465108	9,980672	9,484434	10,515565
59	9,465522	9,980635	9,484887	10,515113
60	9,465935	9,980596	9,485339	10,514661
	Co-ſine	Sine	*Co-tang.*	Tangent
Degree 73.				

Degree 17.				
Sine	*Co-ſine*	Tanget.	*Co-tang.*	
9,465935	9,980596	9,485339	10,514661	60
9,466348	9,980558	9,485791	10,514209	59
9,466761	9,980519	9,486242	10,513758	58
9,467173	9,980480	9,486693	10,513307	57
9,467585	9,980441	9,487143	10,512857	56
9,467996	9,980403	9,487593	10,512407	55
9,468407	9,980364	9,488043	10,511957	54
9,468817	9,980325	9,488493	10,511507	53
9,469227	9,980286	9,488941	10,511059	52
9,469637	9,980247	9,489390	10,510610	51
9,460446	9,980208	9,489838	10,510162	50
9,470455	9,980169	9,490286	10,509714	49
9,471863	9,980130	9,490733	10,509267	48
9,471071	9,980091	9,491180	10,508820	47
9,471678	9,980052	9,491627	10,508373	46
9,472086	9,980012	9,492073	10,507928	45
9,472492	9,979973	9,492519	10,507481	44
9,472898	9,979934	9,492964	10,507035	43
9,473304	9,979894	9,493410	10,506590	42
9,473710	9 979855	9,493854	10,506145	41
9,474115	9,979816	9,494299	10,505701	40
9,474519	9,979776	9,494743	10,505257	39
9,474923	9,979737	9,495186	10,504813	38
9,475327	9,979697	9,495630	10,504370	37
9,475730	9,979658	9,496073	10,503928	36
9,476133	9,979618	9,496515	10,503485	35
9,476536	9,979578	9,496957	10,503043	34
9,476938	9,979539	9,497399	10,502601	33
9,477340	9,979499	9,497840	10,502160	32
9,477741	9,979459	9,498282	10,501718	31
9,478142	9,979419	9,498722	10,501278	30
9,478542	9,979380	9,499163	10,500837	29
9,478942	9,979340	9,499602	10,500398	28
9,479342	9,979300	9,500042	10,499958	27
9,479741	9,979260	9,500481	10,499519	26
9,480140	9,979220	9,500920	10,499080	25
9,480538	9,979180	9,501359	10,498641	24
9,480936	9,979140	9,501797	10,498203	23
9,481334	9,979099	9,502234	10,497765	22
9,481731	9,979059	9,502672	10 497328	21
9,482128	9,979019	9.503109	10 496891	20
9,482525	9,978980	9,503546	10,496454	19
9,482921	9 978939	9,503982	10 496018	18
9,483316	9,978898	9,504418	10,495582	17
9,483711	9,978858	9,504854	10,495146	16
9,484106	9,978817	9,505289	10,494711	15
9,484501	9,978777	9,505724	10,494216	14
9,484895	9,978736	9,506158	10,493841	13
9 485289	9.978696	9,506593	10,493407	12
9,485682	9,978655	9 507026	10,492973	11
9,486075	9,978615	9,507459	10,492540	10
9,486467	9,978574	9,507892	10,492107	9
9,486859	9,978533	9,508326	10,491674	8
9,487251	9,978493	9,508759	10,491241	7
9,487642	9,978452	9,509181	10,490809	6
9,488033	9,978411	9,509622	10,490377	5
9,488424	9,978370	9,510044	10,489946	4
9,488814	9,978329	9,510486	10,489515	3
9,489204	9,978288	9,510916	10,489084	2
9,489593	9,978247	9,511346	10,488654	1
9,489982	9,978206	9,511776	10,488225	0
Co-ſine	Sine	*Co-tang.*	Tangent	M
Degree 72.				

Degree 18.

M	Sine	*Co-ſine.*	Tangēt.	*Co-tang.*
0	9,489982	9,978206	9,511776	10,488224
1	9,490371	9,978165	9,512206	10,487794
2	9,490759	9,978124	9,512635	10,487365
3	9,491147	9,978083	9,513064	10,486936
4	9,491534	9,978042	9,513493	10,486507
5	9,491922	9,978000	9,513921	10,486079
6	9,492308	9,977959	9,514349	10,485651
7	9,492695	9,977918	9,514777	10,485223
8	9,493080	9,977877	9,515204	10,484796
9	9,493466	9,977835	9,515631	10,484369
10	9,493851	9,977794	9,516057	10,483942
11	9,494236	9,977752	9,516484	10,483516
12	9,494620	9,977711	9,516910	10,483090
13	9,495005	9 977669	9,517335	10,482665
14	9,495388	9,977628	9,517761	10,482239
15	9,495771	9,977586	9,518185	10,481814
16	9 496154	9,977544	9,518610	10,481390
17	9,496537	9,977503	9,519034	10,480966
18	9,496919	9,977461	9,519458	10,480542
19	9,497301	9,977419	9,519882	10,480118
20	9,497682	9,977377	9,520305	10,489695
21	9,498063	9,977335	9,520728	10,479272
22	9,498444	9,977293	9,521151	10,478849
23	9,498824	9,977251	9,521573	10,478427
24	9,499204	9,977209	9,521995	10,478005
25	9,499584	9,977167	9,522417	10,477583
26	9,499963	9,977125	9,522838	10,477162
27	9,500342	9,977083	9,523259	10,476741
28	9,500720	9,977041	9,523679	10,476320
29	9,501099	9,977999	9,524109	10,475900
30	9,501476	9,977956	9,524520	10,475480
31	9,501854	9,976914	9,524939	10,475060
32	9,502231	9,976872	9,525359	10,474641
33	9,502607	9,976830	9,525778	10,474222
34	9,502984	9,976787	9,526197	10,473803
35	9,503360	9,976745	9,526615	10,473385
36	9,503735	9,976702	9,527033	10,472967
37	9,504110	9,976660	9,527451	10,472549
38	9,504485	9,976617	9,527868	10,472132
39	9,504840	9,976574	9,528285	10,471715
40	9,505234	9,976532	9,528702	10,471298
41	9,505608	9,976489	9,529118	10,470881
42	9,505981	9,976446	9,529535	10,470465
43	9,506354	9,976404	9,529950	10,470049
44	9,506727	9,976361	9,530366	10,469634
45	9,507099	9,976318	9,530781	10,469219
46	9,507471	9,976275	9,531196	10,468804
47	9,507843	9,976232	9,531611	10,468389
48	9,508214	9,976185	9,532025	10 467975
49	9,508585	9,976146	9 532436	10,467561
50	9,508955	9,976103	9,532852	10,467147
51	9,509326	9,976060	9,533266	10,466734
52	9,509696	9,976017	9,533679	10,466321
53	9,510065	9,975973	9.534092	10,465908
54	9,510434	9,975930	9,534504	10,465496
55	9,510803	9,975887	9,534916	10.465084
56	9,511171	9,975844	9,535328	10,464672
57	9,511540	9,975800	9,535739	10,464261
58	9,511907	9,975757	9,536150	10 463849
59	9,512275	9,975713	9,536561	10.463439
60	9.512642	9,975670	9,536972	10,463028
	Co-ſine	Sine	*Co-tang.*	Tangent.

Degree 71.

Degree 19

Sine	*Co-ſine*	Tangēt.	*Co-tang.*	
9,512642	9,975670	9,536972	10,463028	60
9,513009	9,975626	9,537382	10,462618	59
9,513375	9,975583	9,537792	10,462208	58
9,513741	9,975539	9,538202	10,461798	57
9,514107	9,975496	9,538610	10,461389	56
9,514472	9.975452	9,539020	10,460980	55
9,514837	9,975408	9,539429	10,460571	54
9,515202	9,975364	9,539837	10,460163	53
9,515566	9,975321	9,540245	10,459755	52
9,515930	9,975277	9,540653	10,459347	51
9,516294	9,975233	9,541061	10,458939	50
9,516657	9,975189	9,541468	10,458532	49
9,517020	9,975145	9,541875	10,458125	48
9,517382	9,975101	9,542281	10,457719	47
9,517745	9,975057	9,542688	10,457312	46
9,518107	9,975013	9,543094	10,456906	45
9,518468	9,974969	9,543499	10,456501	44
9,518829	9,974925	9,543905	10,456095	43
9,519190	9,974880	9,544310	10,455690	42
9,519551	9,974836	9,544715	10,455285	41
9,519911	9 974792	9,545119	10,454881	40
9,520271	9,974747	9,545524	10,454476	39
9,520631	9,974703	9,545927	10,454072	38
9,520990	9,974659	9,546331	10,453669	37
9,521349	9,974614	9,546735	10,453265	36
9,521707	9,974570	9,547138	10,452852	35
9,522065	9,974525	9,547540	10,452459	34
9,522423	9,974480	9,547943	10,452057	33
9,522781	9,974436	9,548345	10,451655	32
9,523138	9,974391	9,548747	10,451253	31
9,523495	9,944346	9,549149	10,450851	30
9,523851	9,974302	9,549550	10,450450	29
9,524208	9,974257	9,549951	10,450049	28
9,524564	9,974212	9,550352	10,449648	27
9,524920	9,974167	9,550752	10,449248	26
9,525275	9,974122	9,551152	10,448848	25
9,525630	9,974077	9,551552	10,448448	24
9,525984	9,974032	9,551952	10,448048	23
9,526339	9,973987	9,552351	10,447649	22
9,526693	9,973942	9,552750	10,447250	21
9,527046	9,973897	9,553149	10,446851	20
9,527400	9,973852	9,553548	10,446452	19
9,527753	9 973807	9,553946	10,446054	18
9,528105	9,973761	9,554344	10,445656	17
9,528458	9,973716	9,554741	10,445259	16
9,528810	9.973671	9,555139	10,444861	15
9,529161	9,973625	9,555536	10,444464	14
9,529513	9,973580	9,555932	10,444068	13
9,529864	9,973535	9,556329	10,443671	12
9,530214	9,973489	9,556725	10,443275	11
9,530565	9,973443	9,557121	10,442879	10
9,530915	9,973398	9,557517	10,442483	9
9,531265	9,973352	9,557912	10,442088	8
9,531614	9,973307	9,558308	10,441693	7
9,531963	9,973261	9,558702	10,441298	6
9,532312	9,973215	9,559097	10,440903	5
9,532661	9,973169	9,559491	10,440509	4
9,533009	9,973123	9,559885	10,440115	3
9,533357	9,973078	9,560279	10,439721	2
9,533704	9,973032	9,560673	10,439327	1
9,534052	9,972986	9,561066	10,438934	0
Co-ſine	Sine	*Co-tang.*	Tangent,	M

Degree 70.

Degree 20.				
M	Sine	*Co-ſine.*	Tangēt,	*Co-tang.*
0	9,534052	9,972986	9,561066	10,438934
1	9,534399	9,972940	9,561459	10,438541
2	9,534746	9,972894	9,561851	10,438148
3	9,535091	9,972848	9,562244	10,437756
4	9,535437	9,972801	9,562636	10,437364
5	9,535782	9,972755	9,563028	10,436972
6	9,536129	9,972709	9,563419	10,436580
7	9,536474	9,972663	9,563811	10,436189
8	9,536818	9,972617	9,564202	10 435798
9	9,537163	9,972570	9,564592	10,435407
10	9,537507	9,972524.	9,564983	10,435017
11	9,537851	9,972477	9,565373	10,434627
12	9,538194	9,972431	9,565763	10,434237
13	9,538537	9,972384	9,566153	10,433847
14	9,538880	9,972338	9,566542	10,433457
15	9,539222	9,972291	9,566932	10,433068
16	9,539565	9,972245	9,567320	10,432679
17	9,539907	9,972198	9,567709	10,432291
18	9,540249	9,972151	9,568097	10,431902
19	9,540590	9,972105	9,568486	10,431514
20	9,540931	9,972058	9,569873	10,431126
21	9,541272	9,972011	9,569261	10,430739
22	9,541612	9,971964	9.569648	10,430351
23	9,541953	9,971917	9,560035	10,429964
24	9 542292	9 971870	9,560422	10,429578
25	9,542632	9 971823	9,560809	10.429191
26	9,542971	9,971776	9,571195	10,428805
27	9 543310	9,971729	9,571581	10,428419
28	9,543649	9.971682	9,571967	10,428033
29	9,543987	9,971635	9,572352	10,427648
30	9,544325	9,971588	9,572738	10,427262
31	9,544663	9,971540	9,573123	10,426877
32	9,545000	9,971493	9,573507	10,426492
33	9,545338	9,971446	9,573892	10,426108
34	9,545674	9,971398	9,574276	10,425724
35	9,546011	9,971351	9,574660	10,425340
36	9,546347	9,971303	9,575044	10,424956
37	9,546683	9,971256	9,575427	10,424573
38	9,547019	9,971208	9,575810	10,424189
39	9,547354	9,971161	9,576193	10,423807
40	9,547689	9,971112.	9,576576	10,423424
41	9,548024	9,971065	9,576958	10,423041
42	9,548358	9,971018	9,577341	10,422659
43	9,548693	9,970970	9,577723	10,422277
44	9,549026	9,970922	9,578104	10,421896
45	9 549360	9,970874	9,578486	10,421514
46	9,549693	9,970826	9.578867	10,421133
47	9,550026	9,970779	9,579248	10,420752
48	9,550359	9,970731	9,579628	10,420371
49	9,550692	9,970683	9,580009	10,419991
50	9,551024	9,970634	9,580389	10,419611
51	9,551355	9,970586	9,580769	10,419231
52	9,551687	9,970538	9,581149	10,418851
53	9 552018	9,970490	9,581528	10,418472
54	9,552349	9,970442	9,581907	10,418092
55	9,552680	9,970394	9,582286	10,417713
56	9,553010	9,970345	9,582665	10,417335
57	9,553340	9,970297	9,583043	10,416956
58	9,553670	9,970249	9,583422	10,416578
59	9,554000	9,970200	9,583800	10,416200
60	9,554329	9.970152	9,584177	10,415823
	Co-ſine	Sine	*Co-tang.*	Tangent
Degree 69.				

Degree 21.				
Sine	*Co-ſine*	Tangēt.	*Co-tang.*	
9,554329	9,970152	9,584177	10,415822	60
9,554658	9.970103	9,584555	10,415445	59
9,554987	9,970055	9,584932	10,415068	58
9,555315	9,970006	9,585308	10,414691	57
9,555643	9,969957	9,585636	10 414314	56
9,555971	9.969909	9,586062	10,413938	55
9,556299	9,969860	9,586439	10,413561	54
9,556626	9,969811	9,586815	10,413185	53
9,556953	9,969762	9,587190	10,412800	52
9,557279	9.969713	9,587566	10,412434	51
9,557606	9,969665	9,587941	10,412059	50
9,557932	9,969616	9,588316	10.411684	49
9,558258	9,969567	9,588691	10,411309	48
9 558583	9,969518	9,589066	10,410934	47
9,558909	9,969469	9,589440	10,410560	46
9,559234	9,969419	9,589814	10,410185	45
9 559558	9,969370	9,590188	10,409812	44
9,559883	9,969321	9,590561	10,409438	43
9,560207	9,969272	9,590935	10,409065	42
9,560531	9,969223	9,591308	10,408692	41
9,560855	9 969173	9,591681	10,408319	40
9,561178	9,969124	9,592054	10,407946	39
9,561501	9.969075	9,592426	10,407574	38
9,561824	9,969025	9,592798	10,407201	37
9,562146	9,968976	9,593170	10,406829	36
9,562468	9,968926	6,593542	10,406457	35
9,562790	9,968877	9,593914	10,406086	34
9,563112	9,968827	9,594285	10,405715	33
9,563433	9,968777	9,594656	10,405344	32
9,563754	9,968728	9,595027	10,405073	31
9,564075	9.968678	9,595397	10,404602	30
9,564396	9,968628	9,595768	10,404232	29
9,564716	9,968578	9,596138	10.403862	28
9,565036	9,968528	9,596508	10,403492	27
9,565356	9,968478	9,596878	10,403122	26
9,565675	9,968428	9,597247	10,402753	25
9,565995	9,968378	9,597616	10,402384	24
9,566314	9,968328	9,597985	10,402015	23
9,566632	9,968278	9,598354	10,401646	22
9,566951	9,968228	9,598722	10,401277	21
9,567269	9,968178	9,599091	10,400909	20
9,567587	9,968128	9.599459	10,400541	19
9,567904	9,968078	9,599827	10,400178	18
9,568222	9,968027	9,600194	10,399806	17
9,568539	9,967977	9,600562	10,399438	16
9,568855	9 967927	9 600929	10.399071	15
9 569172	9,967876	9,601296	10,398704	14
9,569488	9,967826	9,601662	10,398337	13
9,569804	9,967775	9,602029	10,397971	12
9,570120	9,967725	9,602395	10,397605	11
9,570435	9,967674	9,602761	10,397239	10
9 570751	9,967623	9,603127	10,396873	9
9,571065	9,967573	9,603493	10,396507	8
9,571380	9,967522	9,603858	10,396142	7
9,571695	9,967471	9,604223	10,395777	6
9,572009	9.967420	9,604588	10,395412	5
9,572322	9,967370	9.604953	10,395047	4
9,572636	9,967319	9,605317	10,394683	3
9,572949	9,967268	9,605681	10,394318	2
9,573263	9,967217	9,606046	10.393954	1
9,573575	6 967166	9,606409	10,393590	0
Co-ſine	Sine	*Co-tang.*	Tangent	M
Degree 68.				

Degree 22.

M	Sine	Co-ſine.	Tangēt.	Co-tang.
0	9,573575	9,967166	9,606409	10,393590
1	9,573888	9,967115	9,606773	10,393227
2	9,574200	9.967064	9,607136	10,392863
3	9,574512	9,967012	9,607500	10,392500
4	9 574824	9,966961	9,607862	10,392137
5	9,575135	9,966910	9,608225	10.391774
6	9,575447	9,966859	9,608588	10,391412
7	9,575758	9,966807	9,608950	10,391050
8	9,576068	9,966756	9,609312	10,390688
9	9 576379	9,966705	9,609674	10,390326
10	9,576689	9,966653	9,600036	10,389964
11	9,576999	9,966602	9,610397	10,389603
12	9,577309	9,966550	9,610758	10,389241
13	9,577618	9,966499	9,611119	10,388880
14	9,577927	9,966447	9,611480	10,388520
15	9,578236	9,966395	9,611841	10 388159
16	9,578545	9 966344	9,612201	10,387799
17	9,578853	9,966292	9,612561	10,387438
18	9,579161	9,966240	9,612921	10,387078
19	9,579469	9,966188	9,613281	10,386719
20	9,579777	9,966136	9,613641	10,386359
21	9,580084	9,966084	9,614000	10,386000
22	9,580392	9,966032	9,614359	10,385641
23	9,580698	9,965980	9,614718	10,385282
24	9,581005	9,965928	9,615077	10 384923
25	9,581311	9,965876	9,615435	10 384565
26	9,581618	9,965824	9,615793	10,384207
27	9,581923	9,965772	9,616151	10,383448
28	9,582229	9,965720	9,616509	10,383491
29	9,582534	9,965668	9,616867	10,383133
30	9,582840	9,965615	9,617224	10,382776
31	9,583144	9,965563	9,617581	10,382418
32	9,183449	9,965511	9,617938	10,382061
33	9,583753	9,965458	9,618295	10,381705
34	9,584058	9,965406	9,618652	10,381348
35	9,584361	9,965353	9,619008	10,380992
36	9,584665	9,965301	9,619364	10,380635
37	9,584968	9,965248	9,619720	10.380279
38	9,585271	9,965195	9,620076	10,379924
39	9,585574	9,965143	9,620432	10,379568
40	9,585877	9,965090	9,620787	10,379213
41	9,586179	9,965037	9,621142	10,378858
42	9,586481	9,964984	9,621497	10,378503
43	9,586783	9,964931	9,621852	10,378148
44	9,587085	9 964878	9,622206	10,377793
45	9,587386	9,964825	9,622561	10 377439
46	9,587687	9,964772	9,622915	10,377085
47	9,587988	9,964719	9,623269	10,376731
48	9,588289	9,964666	9,623623	10,376377
49	9,588589	9 964613	9 623976	10,376024
50	9,588890	9,964560	9 624330	10,375670
51	9,589190	9,964507	9,624683	10,375317
52	9,589489	9,964454	9,625036	10,374964
53	9,589789	9,964400	9,625388	10,374612
54	9,590088	9,964347	9,625741	10,374259
55	9,590387	9,964294	9.626093	10,373907
56	9,590686	9,964240	9,626445	10,373555
57	9,590984	9,964187	9,626797	10,373203
58	9,591282	9,964133	9,627149	10,372850
59	9,591580	9,964080	9,627501	10,372499
60	9,591878	9,964026	9,627852	10,372148
	Co-ſine	Sine	Co-tang.	Tangent.

Degree 67.

Degree 23

Sine	Co-ſine	Tangēt.	Co-tang.	
9,591878	9,964026	9,627852	10 372148	60
9,592175	9,963972	9,628203	10,371797	59
9,592473	9,963919	9,628554	10,371446	58
9,592770	9,963865	9,628905	10,371095	57
9,593067	9,963811	9,629255	10,370744	56
9,593363	9,963757	9,629606	10 370394	55
9,593659	9,963703	9,629956	10,370044	54
9,593955	9,963650	9,630306	10,369694	53
9,594251	9,963596	9,630655	10,369344	52
9,594547	9,963542	9,631005	10,368995	51
9,594842	9,963488	9,631354	10,368645	50
9,595137	9,963433	9,631704	10,368296	49
9,595432	9,963379	9,632053	10,367947	48
9,595727	9,963325	9,632401	10.367598	47
9.596021	9,963271	9 632750	10,367250	46
9,596315	9,963217	9,633098	10,366901	45
9,596610	9,963102	9,633447	10,366553	44
9,596903	9,963108	9,633795	10,366205	43
9,597196	9,963054	9,634143	10,365857	42
9,597490	9,962999	9,634490	10,365510	41
9,597783	9,962945	9,634838	13,365162	40
9,598075	9.962892	9,635185	10,364815	39
9,598368	9,962836	9,635530	10,364463	38
9,598660	9,962781	9 635879	10,364121	37
9,598952	9,962726	9,636226	10,363774	36
9,599244	9,962672	9,636572	10,363428	35
9,599536	9 962617	9,636918	10,363081	34
9,599827	9,962562	9,637205	10,362735	33
9,600118	9,962507	9,637610	10,362389	32
9,600409	9,962453	9,637956	10,362044	31
9,600700	9,962398	9,638302	10,361698	30
9,600990	9,962343	9,638647	10,361353	29
9,601280	9,962288	9,638992	10,361007	28
9,601570	9,962233	9,639337	10,360662	27
9 601860	9,962178	9,639682	10,360318	26
9 602149	9,962122	9,640027	10,359973	25
9,602439	9,962067	9,640371	10,359629	24
9,602728	9.962012	9,640716	10,359284	23
9 603017	9,961957	9,641060	10,358940	22
9,603305	9,961902	9,641404	10,358596	21
9,603594	9,961846	9,641747	10,358253	20
9,603882	9,961791	9,642091	10 357909	19
9,604170	9,961735	9,642434	10,357566	18
9,604457	9,961680	9,642777	10,357223	17
9,604745	9,961624	9,643120	10,356980	16
9,605032	9,961569	9,643463	10,356537	15
9,605319	9,961513	9,643806	10,356194	14
9,605606	9,961458	9,644148	10,355852	13
9,605892	9,961402	9,644490	10,355510	12
9,606179	9,961346	9,644832	10 355168	11
9,606465	9.961290	9,645174	10,354826	10
9,606750	9 961235	9,645516	10,354484	9
9,607036	9,961179	9,645857	10.354142	8
9,607322	9,961123	9,646199	10,353801	7
9,607607	9,961067	9,646540	10,353460	6
9,607892	9,961011	9,646881	10 353119	5
9,608176	9,960955	9,647222	10,352778	4
9,608461	9,960899	9,647562	10,352438	3
9,608745	9 960842	9,647903	10,352097	2
9,609029	9,960786	9,648243	10,351757	1
9 609313	9,960730	9,648583	10.351417	0
Co-ſine	Sine	Co-tang.	Tangent,	M

Degree 66.

	Degree 24.				Degree 25.				
M	Sine	*Co-ſine.*	Tangēt,	*Co-tang.*	Sine	*Co-ſine*	Tangēt.	*Co-tang.*	
0	9,609313	9,960730	9,648583	10,351417	9,625948	9,957276	9,668672	10,331327	60
1	9,609597	9,960674	9,648923	10,351077	9,626219	9,957217	9,669002	10,330998	59
2	9,609880	9,960617	9,649263	10,350737	9,626490	9,957158	9,669332	10,330668	58
3	9,610163	9,960561	9,649602	10,350398	9,626760	9,957099	9,669661	10,330339	57
4	9,610446	9.960505	9,649942	10,350058	9,627030	9,957040	9,669990	10,330009	56
5	9,610729	9,960448	9,650281	10,349719	9,627300	9,956981	9,670320	10,329680	55
6	9,611012	9,960392	9,650620	10,349380	9,627570	9,956922	9,670649	10,329351	54
7	9,611294	9,960335	9,650959	10,349041	9,627840	9,956862	9,670977	10,329022	53
8	9,611576	9,960279	9,651297	10,348703	9,628109	9,956803	9,671306	10,328694	52
9	9,611858	9,960222	9,651636	10,348364	9,628378	9,956744	9,671634	10,328365	51
10	9,612140	9,960165	9,651974	10,348026	9,628647	9,956684	9,671963	10,328037	50
11	9,612421	9,960109	9,652312	10,347688	9,628916	9,956625	9,672291	10,327709	49
12	9,612702	9,960052	9,652650	10,347350	9,629184	9,956565	9,672619	10,327381	48
13	9,612983	9,959995	9,652988	10,347012	9,629453	9,956506	9,672947	10,327053	47
14	9 613264	9,959938	9,653326	10,346674	9,629721	9,956446	9,673274	10,326725	46
15	9,613545	9,959881	9,653663	10,346337	9,629989	9,956387	9,673603	10,326398	45
16	9,613825	9,959824	9,654000	10,345999	9,630257	9,956327	9,673929	10,326070	44
17	9,614105	9,959768	9,654337	10,345662	9,630524	9,956267	9,674256	10,325743	43
18	9,614385	9,959710	9,654674	10,345325	9,630792	9,956208	9,674584	10,325416	42
19	9,614665	9,959653	9,655011	10,344989	9,631059	9,956148	9,674910	10,325089	41
20	9,614944	9,959596	9,655348	10,344652	9,631326	9,956088	9,675237	10,324763	40
21	9,615223	9,959539	9,655684	10,344316	9,631592	9,956029	9,675564	10,324436	39
22	9,615502	9,959482	9 656020	10,343980	9,631859	9,955969	9,675890	10,324110	38
23	9,615781	9,959425	9,656356	10,343643	9,632125	9,955909	9,676216	10,323783	37
24	9,616060	9,959367	9,656692	10,343308	9,632392	9,955849	9,676543	10,323457	36
25	9,616338	9,959310	9,657028	10,342972	9,632657	9,955789	9,676869	10,323131	35
26	9,616616	9,959253	9,657363	10,342636	9,632923	9,955739	9,677194	10,322805	34
27	9,616894	9,959195	9,657699	10,342301	9,633189	9,955669	9,677520	10,322480	33
28	9,617172	9,959138	9,658034	10,341966	9,633454	9,955609	9,677845	10,322154	32
29	9,617450	9,959080	9,658369	10,341531	9,633719	9,955548	9,678171	10,321829	31
30	9,617727	9,959023	9,658704	10,341296	9,633984	9,955488	9 678496	10,321504	30
31	9,618004	9,958965	9,659039	10,340926	9,634249	9,955428	9,678821	10.621179	29
32	9,618281	9,958908	9,659373	10,340627	9,634514	9,955367	9,679146	10,320854	28
33	9,618558	9,958850	9,659708	10,340292	9 634778	9,955307	9,679471	10,320529	27
34	9,618834	9,958792	9,660042	10,339958	9,635042	9,955246	9,679795	10,320205	26
35	9,619110	9,958734	9,660376	10,339624	9,635306	9,955186	9,680120	10,316880	25
36	9,619386	9,958677	9,660710	10,339290	9 635570	9,955125	9 680444	10,319556	24
37	9,619662	9,958619	9,661043	10,338957	9,635833	9,955065	9,680768	10,319232	23
38	9,619938	9,958561	9,661377	10,338623	9,636097	9,955004	9,681092	10,318908	22
39	9,620213	9,958503	9,661710	10,338290	9,636360	9,954944	9,681416	10,318584	21
40	9,620488	9,958445	6,662043	10,337956	9,636623	9,954883	9,681740	10,318260	20
41	9,620763	9,958387	9,662376	10,337623	9,636886	9,954823	9,682063	10,317937	19
42	9,621038	9,958329	9,662709	10,337291	9,637148	9,954762	9,682386	10,317613	18
43	9,621313	9,958271	9,663042	10,336958	9,637411	9,954701	9,682710	10,317290	17
44	9,621587	9,958212	9,663374	10,336625	9,637673	9,954640	9,683033	10,316967	16
45	9,621861	9,958154	9,663707	10,336293	9,637935	9 954579	9,683356	10,316644	15
46	9,622135	9,958096	9,664039	10,335961	9,638197	9,954518	9,683678	10,316321	14
47	9,622409	9,958038	9,664371	10,335629	9,638458	9,954457	9,684001	10,315999	13
48	9,622682	9,957979	9,664703	10,335297	9,638720	9,954396	9,684324	10,315676	12
49	9,622956	9,957921	9,665035	10 334965	9,638981	9,954335	9 684646	10,315354	11
50	9,623229	9,957862	9,665366	10,334634	9,639242	9,954274	9,684968	10,315032	10
51	9,623502	9,957804	9,665697	10,334302	9,639503	9,954213	9,685290	10,314710	9
52	9,623774	9,957745	9,666029	10.333971	9,639764	9,954152	9,685612	10,313388	8
53	9,624047	9,957687	9,666360	10,333640	9 640024	9,954090	9,685934	10,314066	7
54	9,624319	9,957628	9,666691	10,333309	9,640284	9,954029	9,686255	10,313745	6
55	9,624591	9,957570	9,667021	10,332979	9,640544	9,954968	9,686577	10,313423	5
56	9,624863	9,957511	9,667352	10,332648	9,640804	9,953906	9,686898	10,313102	4
57	9.625134	9,957452	9,667682	10,332318	9,641064	9,953845	9,687219	10,312781	3
58	9,625406	9,957393	9,668012	10,331987	9,641323	9,953783	9,687540	10,312460	2
59	9,625677	9,957334	9,668343	10,331657	9,641583	9 953722	9,687861	10,312138	1
60	9,625948	9.957276	9,668672	10,331327	9,641842	9,953660	9,688182	10,311818	0
	Co-ſine	Sine	*Co-tang.*	Tangent	*Co-ſine*	Sine	*Co-tang.*	Tangent	M
	Degree 65.				Degree 64.				

Degree 26.

M	Sine	*Co-ſine.*	Tanget.	*Co-tang.*
0	9,641842	9,953660	9,688182	10,311818
1	9,642101	9,953598	9,688502	10,311498
2	9,642360	9,953537	9,688823	10,311177
3	9,642618	9,953475	9,689143	10,310857
4	9,642876	9,953413	9,689463	10,310537
5	9,643135	9,953351	9,689783	10,310217
6	9,643393	9,953290	9,690103	10,309897
7	9,643650	9,953228	9,690423	10,309577
8	9.643908	9.953166	9,690742	11,309258
9	9,644165	9 953104	9,691063	10,308938
10	9,644423	9,953042	9,691381	10,308619
11	9,644680	9,952980	9,691700	10,308300
12	9,644936	9,952917	9,692019	10,307981
13	9,645193	9,952855	9,692338	10,307662
14	9,645449	9,952793	9,692656	10,307343
15	9,645706	9,952731	9,692975	10,307025
16	9,645962	9,952668	9,693293	10,306706
17	9,646218	9,952606	9,693612	10,306388
18	9,646473	9.952544	9,693930	10,306070
19	9,646729	9,952481	9.694248	10,305752
20	9,646984	9,952419	9,694566	10,305434
21	9,647239	9,952356	9,694883	10,305117
22	9,647494	9,952294	9 695201	10,304799
23	9,647749	9,952231	9,695518	10,304482
24	9,648004	9,952168	9,695835	10,304164
25	9,648258	9,952105	9,696153	10,303847
26	9,648512	9,952043	9,696470	10,303530
27	9,648766	9,951980	9,696786	10,303213
28	9,648020	9,951917	9,697103	10,302897
29	9,649274	9,951854	9,697420	10,302580
30	9,649527	9,951791	9,697738	10,302264
31	9,649781	9 951728	9,698052	20,301947
32	9.650034	9,951665	9,698369	10,301631
33	9.650287	9,951602	9.698685	10,301315
34	9,650519	9.951539	9,699001	10,300999
35	9,650798	9,951476	9,699316	10,300684
36	9,651044	9,951412	9,699632	10,300368
37	9,651296	9,951349	9,699947	10,300052
38	9,651648	9,951286	9,700263	10,299737
39	9,651800	9,951222	9,700578	10,299422
40	9,652052	9,951159	9,700893	10,299107
41	9,652303	9,951095	9,701208	10,298792
42	9,652555	9,951032	9,701522	10,298477
43	9.652806	9,950968	9 701837	10,298163
44	9,653057	9,950905	9,702152	10,297848
45	9,653307	9,950841	9,702466	10,297534
46	9,653558	9,950777	9,702780	10,297219
47	9,653808	9,950714	9,703095	10,296905
48	9,654059	9,950650	9,703409	10,296591
49	9,654309	9,950586	9,703722	10,296277
50	9,654558	9,950522	9,704036	10,295964
51	9,654808	9,950458	9,704350	10,295650
52	9.655057	9,950394	9 704663	10,295337
53	9,655307	9,950330	9,704976	10,295023
54	9,655556	9,950266	9,705290	10,294710
55	9,655805	9,950202	9,705603	10,294397
56	9,656053	9,950138	9,705915	10,294084
57	9,656302	9,950074	9,706228	10,293771
58	9,656550	9,950009	9,706541	10,293459
59	9,656799	9,949945	9,706853	10,293146
60	9 656347	9.949881	9,707166	10,292834
	Co-ſine	Sine	*Co-tang.*	Tangent.

Degree 63.

Degree 27

Sine	*Co-ſine*	Tanget.	*Co-tang.*	
9,657047	9,949880	9,707166	10,292834	60
9,657295	9,949816	9,707478	10,292523	59
9,657542	9,949752	9,707790	10,292210	58
9,657790	9.949687	9,708102	10,291897	57
9,658037	9,949623	9,708414	10,291586	56
9,658284	9,949598	9,708726	10,291274	55
9,658531	9,949494	9,709037	10,290962	54
9,658777	9,949429	9,709349	10,290651	53
9,659024	9,949364	9,709660	10,290340	52
9,659271	9,949300	9,709971	10,290029	51
9 659517	9,949235	9,710282	10,289718	50
9,659763	9,949170	9,710593	10,289407	49
9,660009	9,949105	9,710904	10,289096	48
9,660255	9,949040	9,711214	10,288785	47
9,660500	9,948976	9,711525	10,288475	46
9,660746	9,948910	9,711836	10,288164	45
9,660991	9,948845	9,712146	10,287854	44
9,661236	9,948780	9,712456	10,247544	43
9,661481	9,948715	9,712766	10,287234	42
9,661726	9,948650	9,713076	10,286924	41
9,661970	9,948584	9,713386	10,286614	40
9,662214	9,948519	9,713695	10,286305	39
9,662459	9,948453	9,714005	10,285995	38
9,662702	9,948388	9,714314	10,285686	37
9,662947	9,948323	9,714624	10,285376	36
9,663190	9.948257	9,714933	10,285067	35
9,663433	9,948191	9,715241	10,284758	34
9,663677	9,948126	9,715550	10,284449	33
9,663920	9,948060	9,715859	10,284140	32
9,664163	9,947995	9,716168	10,283832	31
9,664406	9,947929	9,716477	10,283523	30
9,664648	9,947863	9,716785	10,283215	29
9,664891	9,947797	9,717093	10,282907	28
9,665133	9,947731	9,717401	10,282598	27
9,665375	9,947665	9,717709	10,282290	26
9,665617	9,947599	9,718017	10,281983	25
9,665858	9,947533	9,718325	10,281675	24
9,666100	9,947467	9,718633	10,281367	23
9,666341	9,947401	9,718940	10,281060	22
9,666583	9,947335	9,719248	10,280752	21
9,666824	9,947269	9,719555	10,280445	20
9,667065	9,947203	9,719862	10,280138	19
9,667305	9,947136	9,720169	10,279831	18
9,667546	9,947070	9,720476	10,279524	17
9,667786	9,947004	9,720783	10,279217	16
9.668026	9,946937	9 721089	10,278911	15
9,668266	9,946871	9,721395	10,278604	14
9,668506	9,946804	9,721702	10,278298	13
9,668746	9,946738	9 722008	10,277991	12
9,668986	9,946671	9,722315	10,277685	11
9,669225	9,946604	9 722621	10,277379	10
9.669464	9,946537	9,722927	10,277073	9
9,669703	9,946471	9,723232	10,276768	8
9,669942	9,946404	9,723538	10,276462	7
9,670181	9,946337	9,723843	10,276156	6
9,670419	9,946270	9,724149	10,275851	5
9,670657	9,946203	9,724454	10,275546	4
9,670896	9,946136	9,724759	10,275240	3
9,671134	9,946069	9,725065	10,274935	2
9,671372	9,946002	9,725369	10,274630	1
9,671609	9,945935	9 725674	10,274326	0
Co-ſine.	Sine	*Co-tang.*	Tangent,	M

Degree 62.

Degree 28.

M	Sine	*Co-ſine.*	Tanget.	*Co-tang.*
0	9,671609	9,945935	9,725674	10,274326
1	9,671847	9,945868	9,725979	10,274021
2	9,672084	9,945800	9,726284	10,273816
3	9,672321	9,945733	9,726588	10,273412
4	9,672558	9,945666	9,726892	10,273107
5	9,672795	9,945598	9,727197	10,272803
6	9,673032	9,945531	9,727501	10,272499
7	9,673268	9,945463	9,727805	10,272195
8	9,673505	9,945396	9,728109	10,271891
9	9,673741	9,945328	9,728412	10,271587
10	9,673977	9,945261	9,728716	10,271284
11	9,674213	9,945193	9,729020	10,270980
12	9,674448	9,945125	9,729323	10,270677
13	9,674684	9,945058	9,729626	10,270374
14	9,674919	9,944990	9,729929	10,270070
15	9,675154	9,944922	9,730232	10,269767
16	9,675389	9,944854	9,730535	10,269464
17	9,675623	9,944786	9,730838	10,269162
18	9,675859	9,944718	9,731141	10,268859
19	9,676094	9,944650	9,731443	10,268556
20	9,676328	9,944582	9,731746	10,268254
21	9,676562	9,944514	9,732048	10,267952
22	9,676796	9,944446	9,732351	10,267649
23	9,677030	9,944377	9,732653	10,267347
24	9,677264	9,944309	9,732955	10,267045
25	9,677497	9,944241	9,733257	10,266743
26	9,677731	9,944172	9,733558	10,266441
27	9,677964	9,944104	9,733860	10,266140
28	9,678197	9,944016	9,734162	10,265838
29	9,678430	9,943967	9,734463	10,265537
30	9,678663	9,943898	9,734764	10,265236
31	9,678895	9,943830	9,735666	10,264934
32	9,679128	9,943761	9,735362	10,264633
33	9,670360	9,943692	9,735668	10,264332
34	9,679592	9,943624	9,735968	10,264031
35	9,679824	9,943555	9,736269	10,263731
36	9,680056	9,943486	9,736570	10,263430
37	9,680288	9,943417	9,736870	10,263130
38	9,680519	9,943348	9,737171	10,262829
39	9,680750	9,943279	9,737471	10,262529
40	9,680982	9,943210	9,737771	10,262229
41	9,681213	9,943141	9,738071	10,261929
42	9,681443	9,943072	9,738371	10,261629
43	9,681674	9,943003	9,738671	10,261329
44	9,681904	9,942933	9,738971	10,261029
45	9,682135	9,942864	9,739271	10,260729
46	9,682365	9,942795	9,739570	10,260430
47	9,682595	9,942725	9,739870	10,260130
48	9,682825	9,942656	9,740169	10,259831
49	9,683055	9,942587	9,740468	10,259532
50	9,683284	9,942517	9,740767	10,259233
51	9,583514	9,942448	9,741066	10,258934
52	9,683743	9,942378	9,741365	10,258635
53	9,683972	9,942308	9,741664	10,258336
54	9,684201	9,942239	9,741962	10,258038
55	9,684430	9,942169	9,742261	10,257739
56	9,684658	9,942099	9,742559	10,257441
57	9,684887	9,942029	9,742858	10,257142
58	9,685115	9,941059	9,743156	10,256844
59	9,685343	9,941889	9,743454	10,256546
60	9,685571	9,941819	9,743751	10,256248
	Co-ſine	Sine	*Co-tang.*	Tangent.

Degree 61.

Degree 29

Sine	*Co-ſine*	Tanget.	*Co-tang.*	
9,685571	9,941819	9,743752	10,256248	60
9,685799	9,941749	9,744050	10,255950	59
9,686027	9,941679	9,744348	10,255652	58
9,686254	9,941609	9,744645	10,255355	57
9,686482	9,941539	9,744943	10,255057	56
9,686709	9,941468	9,745240	10,254760	55
9,686936	9,941398	9,745538	10,254462	54
9,687163	9,941328	9,745835	10,254165	53
9,687389	9,941257	9,746132	10,253868	52
9,687616	9,941187	9,746429	10,253571	51
9,687842	9,941116	9,746726	10,253274	50
9,688069	9,941046	9,747023	10,252977	49
9,688295	9,940975	9,747319	10,252680	48
9,688523	9,940905	9,747616	10,252384	47
9,688747	9,940834	9,747912	10,252087	46
9,688972	9,940763	9,748209	10,251791	45
9,689198	9,940693	9,748505	10,251495	44
9,689421	9,940622	9,748801	10,251199	43
9,689648	9,940551	9,749097	10,250902	42
9,689873	9,940480	9,749393	10,250607	41
9,690098	9,940409	9,749689	10,250311	40
9,690323	9,940338	9,749985	10,250015	39
9,690548	9,940267	9,750281	10,249719	38
9,690772	9,940196	9,750576	10,249424	37
9,690996	9,940125	9,750872	10,249128	36
9,691220	9,940053	9,751167	10,248833	35
9,691444	9,939982	9,751462	10,248538	34
9,691668	9,939911	9,751757	10,248243	33
9,691892	9,939840	9,752052	10,247948	32
9,692115	9,939768	9,752347	10,247653	31
9,692339	9,939697	9,752642	10,247358	30
9,692562	9,939625	9,752937	10,247063	29
9,692785	9,939554	9,753231	10,246769	28
9,693008	9,939482	9,753526	10,246474	27
9,693231	9,939410	9,753820	10,246180	26
9,693453	9,939339	9,754115	10,245885	25
9,693676	9,939267	9,754409	10,245591	24
9,693898	9,939195	9,754703	10,245297	23
9,694120	9,939123	9,754997	10,245003	22
9,694342	9,939051	9,755291	10,244709	21
9,694564	9,938980	9,755584	10,244415	20
9,694786	9,938908	9,755878	10,244122	19
9,695007	9,938835	9,756172	10,243828	18
9,695229	9,938763	9,756465	10,243535	17
9,695450	9,938691	9,756759	10,243241	16
9,695671	9,938619	9,757052	10,242948	15
9,695892	9,938547	9,757345	10,242655	14
9,696113	9,938475	9,757638	10,242362	13
9,696334	9,938402	9,757931	10,242069	12
9,696554	9,938330	9,758224	10,241776	11
9,696774	9,938257	9,758517	10,241483	10
9,696995	9,938185	9,758810	10,241190	9
9,697215	9,938112	9,759102	10,240898	8
9,697435	9,938040	9,759395	10,240605	7
9,697654	9,937967	9,759687	10,240313	6
9,697874	9,937895	9,759979	10,240021	5
9,698093	9,937822	9,760271	10,239728	4
9,698313	9,937749	9,760564	10,239436	3
9,698532	9,937676	9,760856	10,239144	2
9,698751	9,937603	9,761147	10,238852	1
9,698970	9,937531	9,761439	10,238561	0
Co-ſine	Sine	*Co-tang.*	Tangent,	M

Degree 60.

	Degree 30.				Degree 31				
M	Sine	*Co-ſine.*	Tangẽt.	*Co-tang.*	Sine	*Co-ſine*	Tangẽt.	*Co-tang.*	
0	9,698970	9,937531	9,761439	10,238561	9,711839	9,933066	9 778774	10,221226	60
1	9,699189	9,937458	9,761731	10,238269	9,712049	9,932990	9,779060	10,220940	59
2	9,699407	9,937385	9,762023	10,237977	9,712259	9,932914	9,779346	10,220654	58
3	9,699626	9,937312	9,762314	10,237686	9,712469	9,932838	9,779632	10,220368	57
4	9,699844	9,937238	9,762606	10,237394	9,712679	9,932761	9,779918	10,220082	56
5	9,700062	9,937165	9,762897	10,237103	9,712889	9,932685	9,780203	10,219796	55
6	9,700280	9,937092	9,763188	10,236812	9,713098	9,932609	9,780489	10,219511	54
7	9,700498	9,937019	9,763479	10,236521	9,713308	9,932533	9,780775	10 219225	53
8	9,700716	9,936945	9,763770	10,236230	9,713517	9 932457	9,781060	10,218940	52
9	9,700933	9,936872	9,764061	10,235939	9,713726	9,932380	9,781346	10 218654	51
10	9,701151	9 936799	9,764352	10,235648	9,713935	9,932304	9,781631	10 218369	50
11	9,701568	9,936725	9,764643	10,235357	9,714144	9,932227	9,781916	10,218084	49
12	9,701585	9,936652	9,764933	10,235067	9,724352	9,932151	9,782202	10,217799	48
13	9,701802	9,936578	9,765224	10,234776	9,714561	9,932074	9.782486	10,217514	47
14	9,702019	9,936505	9,765514	10,234486	9,714769	9,931998	9,782771	10,217229	46
15	9,702236	9,936431	9,765805	10 234195	9,714977	9,931921	9,783056	10,216944	45
16	9,702452	9,936357	9,766095	10,233905	9,715186	9,931845	9,783341	10,216659	44
17	9,702669	9,936284	9,766385	10,233615	9,715394	9,931768	9,783626	10,216374	43
18	9,702885	9,936210	9,766675	10,233325	9,715601	9,931691	9,783910	10,216090	42
19	9,703101	9,936136	9,766965	10,233035	9,715809	9,931614	9,784195	10,215805	41
20	9,703317	9,936062	9,767255	10,232745	9,716017	9,931537	9 784479	10,215520	40
21	9,703533	9,935988	9,767545	10,232455	9,716224	9,931460	9,784764	10,215236	39
22	9,703748	9,935914	9,767834	10,232166	9,716431	9,931383	9,785048	10,214952	38
23	9,703964	9,935840	9,768124	10,231876	9,716639	9,931306	9,785332	10,214668	37
24	9,704179	9,935766	9,768413	10,231587	9,716846	9,931229	9,785616	10,214384	36
25	9,704395	9,935692	9,768703	10,231297	9,717053	9,931152	9,785900	10,214099	35
26	9,704610	9,935618	9,768992	10,231008	9,717259	9.931075	9,786184	10,213816	34
27	9,704825	9,935543	9,769281	10,230719	9,717466	9,930998	9,786468	10,213532	33
28	9,705040	9,935469	9,769570	10,230430	9,717672	9,930920	9 786752	10,213248	32
29	9,705254	9,935395	9,769859	10,230141	9.717879	9,930843	9,787036	10,212964	31
30	9,005469	9,935320	9,770148	10,229852	9,718085	9,930766	9,787319	10,212681	30
31	9,705683	9,935246	9,770437	10,229563	9,718291	9,930688	9,787603	10,212397	29
32	9,705897	9 935171	9,770726	10,229274	9,718497	9,930611	9,787886	10,212114	28
33	9,706112	9,935097	9,771015	10,228985	9,718703	9,930533	9,788170	10,211830	27
34	9,706326	9,935022	9,771303	10,228697	9,718909	9,930456	9,788453	10,211547	26
35	9,706539	9,934948	9,771592	10,228408	9,719114	9,930378	9,788736	10,211264	25
36	9,706753	9,934873	9,771880	10,228120	9,719320	9,930300	9,789019	10,210981	24
37	9,706967	9,934798	9,772168	10,227832	9,719525	9,930223	9,78[illegible]02	10,210698	23
38	9,707180	9,934723	9,772456	10,227543	9,719730	9,930145	9,789585	10,210415	22
39	9,707393	9,934649	9,772745	10,227255	9,719935	9.930067	9,789868	10,210132	21
40	9,707606	9 934574	9,773033	10,226967	9,720140	9,929989	9,790151	10,209849	20
41	9,707819	9,934499	9,773321	10,226679	9,720345	9,929911	9,790433	10,209566	19
42	9,708032	9,934424	9,773608	10,226391	9,720549	9,929833	9,790716	10,209284	18
43	9,708245	9,934349	9,773896	19,226104	9,720754	9,929755	9,790999	10,209001	17
44	9,708457	9,934274	9,774184	10,225816	9,720958	9,929677	9,790281	10,208719	16
45	9,708670	9,934199	9,774471	10,225529	9,721162	9,929599	9,791563	10,208436	15
46	9,708882	9,934123	9,774759	10,225241	9,721366	9,929521	9,791846	10,208154	14
47	9,709094	9,934048	9,775046	10,224954	9,721570	9,929442	9 792128	10,207872	13
48	9,709306	9 933973	9,775333	10,224666	9,721774	9,929364	9,792410	10,207590	12
49	9,709518	9,933897	9,775621	10,224379	9,721978	9,929286	9,792692	10,207308	11
50	9,709730	9,933822	9,775908	10,224092	9,722181	9,929207	9,792974	10,207024	10
51	9,709941	9,933747	9,776195	10,223805	9,722385	9,929129	9,793256	10,206744	9
52	9,710153	9,933671	9,776482	10,223518	9,722588	9,929050	9,793538	10,206462	8
53	9,710364	9,933596	9 776768	10,223232	9,722791	9,928972	9,793819	10,206180	7
54	9,710575	9,933520	9,777055	10,222945	9,722994	9,928893	9,794101	10,205899	6
55	9,710786	9,933444	9,777342	10,222658	9,723197	9,928814	9 794383	10,205617	5
56	9,710997	9,933369	9 777628	10 222372	9,723400	9,928736	9 794664	10,205336	4
57	9,711208	9,933293	9,777915	10,222085	9,723603	9 928657	9,794945	10,205054	3
58	9 711418	9,933217	9,778201	10,221799	9,723805	9,928578	9,795227	10,204773	2
59	9,711629	9,933141	9,778487	10,221513	9,724007	9,928499	9,795508	10,204492	1
60	9 711839	9,933066	9,778774	10,221226	9,724210	9,928420	9,795789	10,204211	0
	Co-ſine	Sine	*Co-tang.*	Tangent.	*Co-ſine*	Sine	*Co-tang.*	Tangent	M
	Degree 59.				Degree 58.				

Degree 32.

M	Sine	*Co-ſine.*	Tangēt,	*Co-tang.*
0	9,724210	9,928420	9,795789	10,204211
1	9,724412	9,928341	9,796070	10,203930
2	9,724614	9,928262	9,796351	10,203649
3	9,724816	9,928183	9,796632	10,203368
4	9,725017	9,928104	9,796913	10,203087
5	9,725219	9,928025	9,797194	10,202806
6	9,725420	9,927946	9,797474	10,202522
7	9,725622	9,921867	9,797755	10,202245
8	9,725823	9,927787	9,798036	10,201964
9	9,726024	9,927708	9,798316	10,201684
10	9,726225	9.927628	9,798596	10,201404
11	9,726426	9,927549	9,798877	10,201123
12	9,726626	9,927469	9,799157	10,200843
13	9,726827	9,927390	9,799437	10,200563
14	9,727027	9,927310	9,799717	10,200283
15	9,727228	9,927231	9,799997	10,200003
16	9,727428	9,927151	9,800277	10,199723
17	9,727628	9,927071	9,800557	10,199443
18	9,727828	9,926991	9,800836	10,199163
19	9,728027	9,926911	9,801116	10,198884
20	9,728227	9,926831	9,801396	10,198604
21	9,728427	9,926751	9,801675	10,198325
22	9,728626	9,926671	9,801955	10,198045
23	9,728825	9,926591	9,802234	10,197766
24	9,729024	9,926511	9,802513	10,197487
25	9,729223	9,926431	9,802792	10,197207
26	9,729422	9,926351	9,803072	10,196928
27	9,729621	9,926270	9,803351	10,196649
28	9,729820	9,926190	9,803630	10,196370
29	9,730018	9,926110	9,803908	10,196091
30	9,730216	9,926029	9,804187	10,195813
31	9,730415	9,925949	9,804466	10,195534
32	9,730613	9,925868	9,804745	10,195255
33	9,730811	9,925787	9,805023	10,194977
34	9,731009	9,925707	9,805302	10,194698
35	9,731206	9,925626	9,805580	10,194420
36	9,731404	9,925545	9,805859	10,194141
37	9,731601	9,925464	9,806137	10,193863
38	9,731799	9,925384	9,806415	10,193585
39	9,731996	9,925303	9,806693	10,193309
40	9,732193	9,925222	9,806971	10,193028
41	9,732390	9,925141	9,807249	10,192751
42	9,732587	9,925060	9,807527	10,192433
43	9,732784	9,924978	9,807805	10,192195
44	9,732980	9 924897	9.808083	10,191917
45	9,733177	9,924816	9,808361	10,191639
46	9,733373	9,924735	9,808638	10,191362
47	9,733569	9,924653	9 808916	10,191084
48	9,733765	9.924572	9,809193	10,190807
49	9 733961	9,924491	9,809471	10,190529
50	9,734157	9 924409	9,809748	10,190252
51	9,734353	9,924328	9,810025	10,189975
52	9 734548	9,924246	9,810302	10,189697
53	9,734744	9 924164	9,810580	10,189420
54	9,734939	9 924083	9,810857	10,189143
55	9,735134	9,924001	9,811134	10,188866
56	9,735330	9,923919	9,811410	10,188589
57	9,735525	9,923837	9 811687	10,188313
58	9,735719	9,923755	9,811964	10,188036
59	9,735914	9,923673	9,812241	10,187759
60	9,736109	9,923591	9,812517	10,187483
	Co-ſine	Sine	*Co-tang.*	Tangent

Degree 57.

Degree 33.

Sine	*Co-ſine*	Tangēt.	*Co-tang.*	
9,736109	9.923591	9,812517	10.187483	60
9,736309	9,923509	9,812794	10,187206	59
9,736497	9,923427	9,813070	10,186930	58
9,736692	9,923345	9,813347	10,186653	57
9,736886	9,923263	9,813623	10,186377	56
9,737080	9,923180	9,813899	10,186101	55
9,737274	9,923098	9,814175	10,185824	54
9,737467	9,923016	9,814452	10,185548	53
9,737661	9,922933	9.814728	10,185272	52
9,737854	9,922851	9,815004	10,184996	51
9,738048	9,922768	9,815279	10,184720	50
9,738241	9,922686	9,815555	10,184445	49
9,738434	9,922603	9,815831	10,184169	48
9,738627	9,922520	9,816107	10,183893	47
9,738820	9,922438	9,816382	10,183617	46
9,739013	9,922355	9,816658	10,183342	45
9,739205	9,922272	9,816933	10,183066	44
9,739398	9,922189	9,817209	10,182791	43
9,739590	9,922106	9,817484	10,182516	42
9,739783	9,922023	9,817759	10,182240	41
9,739975	9,921940	9,818035	10,181965	40
9,740167	9,921857	9,818310	10,181690	39
9 740359	9,921774	9,818585	10,181415	38
9,740550	9,921691	9,818860	10 181140	37
9,740742	9,921607	9,819135	10,180865	36
9,740934	9.921524	9,819410	16,180590	35
9,741125	9,921441	9,819684	10,180315	34
9,741316	9,921357	9,819959	10,180041	33
9,741507	9.921274	9,820234	10,179766	32
9,741698	9,921190	9,820508	10,179492	31
9,741889	9,921107	9,820783	10,179217	30
9,742080	9,921023	9,821057	10,178943	29
9,742271	9,920939	9,821332	10,178668	28
9,742461	9,920855	9,821606	10,178394	27
9,742652	9,920772	9,821880	10,178120	26
9,742842	9,920688	9,822154	10,177846	25
9,743032	9,920604	9,822429	10,177571	24
9,743223	9,920520	9 822703	10,177297	23
9,743412	9,920436	9,822977	10,177023	22
9,743602	9,920352	9,823250	10,176739	21
9,743792	9,920268	9,823524	10,176476	20
9,743982	9,920184	9,823798	10,176202	19
9,744171	9,920099	9,824072	10,175928	18
9,744361	9,920015	9,824345	10,175655	17
9,744550	9,919931	9,824619	10,175381	16
9,744739	9,919846	9,824892	10,175108	15
9,744928	9,919762	9.825166	10,174834	14
9,745117	9,919677	9,825439	10,174560	13
9,745306	9,919593	9,825713	10,174287	12
9,745494	9,919508	9,825986	10,174014	11
9,745683	9,919424	9,826259	10,173741	10
9,745871	9,919339	9,826532	10,173468	9
9,746059	9,919254	9,826805	10,173195	8
9,746248	9,919169	9,827078	10,172922	7
9,746436	9,919084	9,827351	10,172649	6
9,746624	9,918999	9,827624	10,172376	5
9,746811	9,918915	9 827897	10 172103	4
9.746999	9,918830	9,828170	10,171830	3
9,747187	9,918744	9,828442	10,171558	2
9,747374	9,918659	9,828715	10,171285	1
9 747562	9,91857	9 828987	10.171013	0
Co-ſine	Sine	*Co-tang.*	Tangent	M

Degree 56.

Degree 34.

M	Sine	*Co-ſine.*	Tangēt.	*Co-tang.*
0	9,747562	9 918574	9,828987	10,171012
1	9,747749	9,918489	9,829260	10,170740
2	9,747936	9,918404	9,829532	10,170468
3	9,748123	9 918318	9,829805	10,170195
4	9 748310	9,918233	9,830077	10,169923
5	9·748497	9,918147	9,830349	10,169651
6	9,748683	9,918062	9,830621	10,169379
7	9,748870	9,917976	9 830893	10,169106
8	9,749056	9,917891	9,831165	10,168834
9	9,749242	9,917805	9,831437	10,168563
10	9,749429	9,917719	9,831709	10,168291
11	9,749615	9,917634	9,831981	10,168019
12	9,749801	9,917548	9,832253	10,167747
13	9,749986	9,917462	9,832525	10,167475
14	9,750172	9,917376	9,832796	10,167204
15	9,750358	9,917290	9,833068	10,166932
16	9,750543	9,917204	9,833339	10,166660
17	9,750729	9,917118	9,833611	10,166389
18	9,750914	9,917032	9,833882	10,166118
19	9,751099	9,916945	9,834154	10,165846
20	9,751284	9,916859	9,834425	10,165575
21	9,751469	9,916773	9,834696	10,165304
22	9,751654	9·916686	9,834967	16,165033
23	9,751838	9,916600	9,835238	10,164762
24	9,752023	9,916514	9,835509	10,164491
25	9,752207	9,916427	9,835780	10,164220
26	9,752392	9,916340	9,836051	10·163949
27	9,752576	9,916254	9,836322	10,163678
28	9,752760	9,916167	9,836593	10,163407
29	9,752944	9,916080	9,836864	10,163136
30	9,753128	9,915994	9,837134	10,162866
31	9,753312	9,915907	9,837405	10,162595
32	9,753495	9,915820	9,837675	10,162325
33	9,753679	9,915733	9,837946	10,162054
34	9,753862	9,915646	9,838216	10,161784
35	9,754046	9,915559	9,838487	10,161513
36	9,754229	9,915472	9,838757	10,161243
37	9,754412	9,915385	9,839027	10,160973
38	9,754595	9,915297	9,839297	10,160702
39	9,754778	9,915210	9,839568	10,160432
40	9,754960	9,915123	9,839838	10,160162
41	9,755143	9,915035	9,840108	10,159892
42	9,755325	9 914948	9,840378	10,159622
43	9,755508	9,914860	9,840647	10,159352
44	9,755690	9,914773	9·840917	10,159083
45	9,755872	9,914685	8,841187	10,158813
46	9,756054	9,914597	9,841457	10,158543
47	9,756236	9,914510	9,841726	10,158273
48	9,756418	9,914422	9,841996	10,158004
49	9,756600	9,914334	9,842266	10,157734
50	9,756781	9,914246	9,842535	10,157465
51	9,756963	9,914158	9,842804	10,157195
52	9,757144	9 914070	9,843074	10,156926
53	9,757326	9,913982	9,843343	10,156657
54	9,757507	9,913894	9,843612	10,156387
55	9,757688	9,913806	9,843882	10,156118
56	9 757869	9,913718	9,844151	10,155849
57	9,758049	9,913630	9,844420	16,155580
58	9,758230	9,913541	9,844689	10,155311
59	9,758411	9,913453	9 844958	10,155042
60	9,758591	9,913364	9,845227	10,154773
	Co-ſine	Sine	*Co-tang.*	Tangent.

Degree 55.

Degree 35

Sine	*Co-ſine*	Tangēt.	*Co-tang.*	
9,758591	9,913364	9,845227	10,154774	60
9,758772	9,913276	9,845496	10,154504	59
9,758952	9,913187	9,845764	10,154235	58
9,759132	9,913099	9,846033	10,153967	57
9,759312	9,913010	9,846302	10,153698	56
9,759492	9,912921	9,846570	10,153429	55
9,759672	9,912833	9,846839	10,153161	54
9,759851	9,912744	9,847107	10,152892	53
9,760031	9,912655	9,847376	10,152624	52
9,760210	9.912566	9,847644	10,152356	51
9,760390	9,912477	9,847913	10,152087	50
9,760569	9,912388	9,848181	10,151819	49
9,760748	9,912299	9,848449	10,151551	48
9,760927	9,912210	9,848717	10,151283	47
9,761106	9,912121	9,848985	10,151015	46
9,761285	9,912031	9,849254	10,150746	45
9,761464	9,911942	9,849522	10,150478	44
9,761642	9,911853	9,849789	10,150214	43
9,761821	9,911763	9,850057	10,149943	42
9,761999	9,911674	9,850325	10,149675	41
9,762177	9,911584	9,850593	10,149407	40
9,762356	9,911495	9,850861	10,149139	39
9,762534	9,911405	9,851128	10,148872	38
9,762712	9,911315	9,851396	10,148604	37
9,762889	9,911226	9,851664	10,148336	36
9,763067	9,911136	9,851931	10,148069	35
9,763245	9,911046	9,852199	10,147801	34
9,763422	9,910956	9,852466	10,147534	33
9·763599	9,910866	9,852731	10,147267	32
9,763777	9,910776	9,853001	10,146999	31
9,763954	9,910686	9,853268	10,146732	30
9,764131	9,910596	9,853532	10,146465	29
9,764308	9,910506	9,853802	10,146198	28
9·764485	9,910415	9,854069	10,145930	27
9,764662	9,910325	9,854336	10,145664	26
9,764838	9,910235	9,854603	10,145397	25
9,765015	9,910144	9,854870	10,145130	24
9,765191	9,910054	9,855137	10,144863	23
9,765367	9,909963	9,855404	10,144596	22
9,765544	9,909873	9,855671	10,144329	21
9,765720	9,909782	9,855937	10,144063	20
9,765896	9,909691	9,856204	10,143796	19
9,766071	9,909601	9,856471	10,143529	18
9,766247	9,909510	9,856737	10,143263	17
9,766423	9,909419	9,857004	10,142996	16
9·766598	9,909328	9,857270	10,142730	15
9,766774	9,909237	9,857537	10,142463	14
9,766949	9,909146	9,857803	10,142197	13
9,767124	9,909955	9,858069	10,141931	12
9,767299	9,908964	9,858336	10,141664	11
9,767474	9,908873	9,858602	10,141398	10
9,767649	9,908781	9,858868	10,141132	9
9,767824	9,908690	9,859134	10,140866	8
9,767997	9,908599	9,859400	10,140600	7
9,768173	9,908507	9,859666	10,140334	6
9,768348	9,908416	9,859932	10,140068	5
9·768522	9,908324	9,860198	10,139802	4
9,768696	9,908233	9,860464	10,139536	3
9,768871	9,908141	9,860730	10,139270	2
9,769045	9,908049	9,860995	10,139005	1
9 769219	9,907958	9,861261	10,138739	0
Co-ſine	Sine	*Co-tang.*	Tangent,	M

Degree 54.

Degree 36.				
M	Sine	*Co-ſine.*	Tangẽt,	*Co-tang.*
0	9,769219	9,907958	9,861261	10,138739
1	9,769392	9,907866	9,861527	10,138473
2	9,769566	9,907774	9,861792	10,138208
3	9,769740	9,907682	9,862058	10,137942
4	9,769913	9,907590	9,862323	10,137677
5	9,770087	9,907498	9,862589	10,137411
6	9,770260	9,907406	9,862854	10,137146
7	9,770433	9,907314	9,863119	10,136880
8	9,770606	9,907221	9,863385	10,136615
9	9,770779	9,907129	9,863650	10,136350
10	9,770952	9,907037	9,863915	10,136085
11	9,771125	9,906945	9,864180	10,135820
12	9,771298	9,906852	9,864445	10,135554
13	9,771470	9,906760	9,864710	10,135289
14	9,771643	9,906667	9,864975	10,135024
15	9,771815	9,906574	9,865240	10,134759
16	9,771987	9,906482	9,865505	10,134495
17	9,772159	9,906389	9,865770	10,134230
18	9,772331	9,906296	9,866035	10,133965
19	9,772503	9,906203	9,866300	10,133700
20	9,772675	9,906111	9,866564	10,133436
21	9,772847	9,906018	9,866829	10,133171
22	9,773018	9,905925	9,867094	10,132906
23	9,773190	9,905832	9,867358	10,132642
24	9,773361	9 905738	9,867623	10,132377
25	9,773533	9,905645	9,867887	10,132113
26	9,773704	9,905552	9,868152	10,131848
27	9,773875	9,905459	9,868416	10,131584
28	9,774046	9,905365	9,868680	10,131320
29	9,774217	9,905272	9,868945	10,131055
30	9,774388	9,905179	9,869209	10,130791
31	9,774558	9,905085	9,864773	10,130527
32	9,774729	9,904992	9,867337	10,130263
33	9,774899	9,904898	9,870001	10,129999
34	9,775070	9,904804	9,870265	10,129735
35	9,775240	9,904711	9,870529	10,129471
36	9,775410	9,904617	9,870793	10,129207
37	9,775580	9,904523	9,871057	10,128943
38	9,775750	9,904429	9,871321	10,128679
39	9,775920	9,904335	9,871585	10,128415
40	9,776090	9,904241	9,871849	10,128151
41	9,776259	9,904147	9,872112	10,127888
42	9,776429	9,904053	9,872376	10,127624
43	9,776598	9,903959	9,872640	10,127360
44	9,776768	9,903864	9,872903	10,127097
45	9,776937	9,903770	9,873167	10,126833
46	9,777106	9,903676	9,873430	10,126570
47	9,777275	9,903581	9,873694	10,126306
48	9,777444	9,903486	9,873957	10,126043
49	9,777613	9,903392	9,874220	10,125780
50	9,777781	9,903298	9,814484	10,125516
51	9,777950	9,903203	9,874747	10,125253
52	9,778119	9,903108	9,875010	10,124990
53	9,778287	9,903013	9,875273	10,124727
54	9,778455	9 902919	9,875536	10,124464
55	9,778623	9,902824	9,875799	10,124201
56	9,778792	9,902729	9,876063	10,123937
57	9,778960	9,902634	9,876326	10,123674
58	9,779129	9,902539	9,876589	10,123411
59	9,779295	9 902444	9,876851	10,123149
60	9,779463	9,902349	9,877114	10,122886
	Co-ſine	Sine	*Co-tang.*	Tangent
Degree 53.				

Degree 37.				
Sine	*Co-ſine*	Tangẽt.	*Co-tang.*	
9,779463	9,902349	9,877114	10,122885	60
9,779631	9,902253	9,877377	10,122623	59
9,779798	9,902158	9 877640	10,122360	58
9,779965	9,902063	9,877903	10,122097	57
9,780133	9,901967	9,878165	10,121834	56
9,780300	9,901872	9,878428	10,121572	55
9,780467	9,901776	9,878691	10,121309	54
9,780634	9,901681	9,878953	10,121047	53
9,780801	9,901585	9,879216	10,120784	52
9,780968	9,901488	9,879478	10,120522	51
9,781134	9,901391	9,879741	10,120259	50
9,781301	9,901298	9,880003	10,119997	49
9,781467	9,901202	9,880265	10,119734	48
9,781634	9,901106	9,880528	10,119472	47
9,781800	9,901010	9,880790	10,119210	46
9,781966	9,900914	9,881052	10,118948	45
9,782132	9,900828	9,881314	10,118686	44
9,782298	9,900722	9,881576	10,118424	43
9,782464	9,900626	9,881839	10,118161	42
9,782690	9,900529	9,882101	10,117899	41
9,782796	9,900433	9,882363	10,117637	40
9,782961	9,900337	9,882625	10,117375	39
9,783127	9,900240	9,882886	10,117114	38
9,783292	9,900144	9,883148	10,116852	37
9,783457	9,900047	9,883410	10,116590	36
9,783623	9,899951	9,883672	10,116328	35
9,783788	9,899854	9,883934	10,116066	34
9,783953	9,899757	9,884195	10,115805	33
9,784118	9,899660	9,884457	10,115543	32
9,784282	9,899563	9,884719	10,115281	31
9,784447	9,899467	9,884980	10,115020	30
9,784616	9,899370	9,885242	10,114758	29
9,784776	9,899273	9,885503	10,114497	28
9,784941	9,899175	9,885765	10,114235	27
9,785105	9,899078	9,886026	10,113974	26
9,785269	9,898981	9,886288	10,113712	25
9,785433	9,898884	9,886549	10,113451	24
9,785591	9,898787	9,886810	10,113190	23
9,785761	9,898689	9,887072	10,112928	22
9,785925	9,898592	9,887333	10,112667	21
9,786088	9,898494	9,887594	10,112406	20
9,786252	9 898397	9,887855	10,112145	19
9,786416	9,898299	9,888116	10,111884	18
9,786579	9,898201	9,888377	10,111623	17
9,786742	9,898104	9,888638	10,111362	16
9,786909	9,898006	9,888899	10,111101	15
9,787069	9,897908	9 889160	10,110840	14
9,787232	9,897810	9,889421	10,110579	13
9,787395	9,897112	9,889682	10,110318	12
9,787557	9,897614	9,889943	10,110057	11
9,787720	9,897516	9,890204	10,109796	10
9,787883	9,897418	9,890465	10,109535	9
9,788045	9,897320	9,890725	10,109275	8
9,788208	9,897222	9,890986	10,109014	7
9,788370	9,897123	9 891247	10,108753	6
9,788532	9,897025	9,891507	10,108493	5
9,788694	9,896926	9,891768	10,108232	4
9,788856	9,896828	9,892028	10,107972	3
9,789018	9,896729	9,892289	10,107711	2
9,789180	9,896631	9,892549	10,107451	1
9,789342	9,896532	9,892810	10,107190	0
Co-ſine	Sine	*Co-tang.*	Tangent	M
Degree 52.				

Degree 38.				
M	Sine	*Co-ſine.*	Tangĕt.	*Co-tang.*
0	9,789342	9,896532	9,892810	10,107190
1	9,789504	9,896433	9,893070	10,106930
2	9,789665	9,896335	9,893330	10,106669
3	9,789827	9 896236	9,893591	10,106409
4	9,789988	9,896137	9,893851	10,106149
5	9,790149	9,896038	9,894111	10,105889
6	9,790310	9,895939	9,894371	10,105628
7	9,790471	9,895840	9,894632	10,105368
8	9,790632	9,895741	9,894892	10,105108
9	9,790793	9,895641	9,895152	10,104848
10	9,790954	9,895542	9,895412	10,104588
11	9,791115	9,895443	9,895672	10,104328
12	9,791275	9,895343	9,895932	10,104068
13	9,791436	9,895244	9,896192	10,103808
14	9,791596	9,895144	9,896452	10,103548
15	9,791756	9,895045	9,896712	10,103288
16	9,791917	9,894945	9,896971	10,103028
17	9,792077	9,894846	9,897231	10,102769
18	9,792237	9,894746	9,897491	10,102509
19	9,792397	9,894646	9,897751	10,102249
20	9,792557	9,894546	9,898010	10,101990
21	9,792716	9,894446	9,898270	10,101730
22	9,792876	9,894346	9,898530	10,101470
23	9,793035	9,894246	9,898789	10,101211
24	9,793195	9,894146	9,899049	10,100951
25	9,793354	9,894046	9,899308	10,100692
26	9,793513	9,893946	9,899568	10,100432
27	9,793673	9,893845	9,899827	10,100173
28	9,793832	9,893745	9,900086	10,099913
29	9,793991	9,893645	9,900346	10,099654
30	9,794149	9,893544	9,900605	10,099395
31	9,794308	9,893444	9,900864	10,099135
32	9,794467	9,893343	9,901124	10,098876
33	9,794626	9,893243	9,901383	10,098617
34	9,794784	9,893142	9,901642	10,098358
35	9,794942	9,893041	9,901901	10,098099
36	9,795101	9,892940	9,902160	10,097839
37	9 795259	9,892839	9,902419	10,097580
38	9,795417	9,892738	9,902678	10,097321
39	9,795575	9,892637	9,902937	10,097062
40	9,795733	9,892536	9,903196	10,096803
41	9,795891	9,892435	9,903455	10,096544
42	9,796049	9,892334	9,903714	10,096285
43	9,796206	9,892233	9,903973	10,096027
44	9,796364	9,892132	9 904232	10,095768
45	9,796521	9,892030	9,904491	10,095509
46	9,796678	9,891929	9,904750	10,095250
47	9,796836	9,891827	9,905008	10,094991
48	9,796993	9,891726	9,905267	10,094733
49	9,797150	9,891624	9,905526	10,094474
50	9,797307	9,891522	9,905784	10,094215
51	9,797464	9,891421	9,906043	10,093957
52	9 797621	9,891319	9,906302	10,093698
53	9,797777	9,891217	9,906560	10,093440
54	9 797934	9,891115	9 906819	10,093181
55	9,798091	9,891013	9,907077	10,092923
56	9,798247	9,890911	9 907336	10,092664
57	9,798403	9,890809	9,907594	10,092406
58	9,798560	9,890707	9,907852	10,092147
59	9,798716	5,890605	9,908111	10,091889
60	9,798872	9,890503	9,908369	10,091631
	Co-ſine	Sine	*Co-tang.*	Tangent.
	Degree 51.			

Degree 39				
Sine	*Co-ſine*	Tangĕt.	*Co-tang.*	
9,798872	9,890503	9,908369	10,091631	60
9,799028	9,890400	9,908627	10,091373	59
9,799184	9 890298	9,908886	10,091114	58
9,799339	9,890195	9,909144	10,090856	57
9,799495	9,890093	9 909402	10,090598	56
9,799651	9,889990	9,909660	10,090340	55
9,799806	9,889888	9,909918	10,090081	54
9,799961	9,889785	9,910176	10,089823	53
9,800117	9,889682	9,910435	10,089565	52
9,800272	9,889579	9,910693	10,089307	51
9,800427	9,889476	9,910951	10,089049	50
9,800582	9,889374	9,911209	10,088791	49
9,800737	9,889271	9,911467	10,088533	48
9,800892	9,889167	9,911724	10,088275	47
9,801047	9,889064	9,911982	10,088017	46
9,801201	9,888961	9 912240	10,087760	45
9,801356	9,888858	9,912498	10,087502	44
9,801510	9,888755	9 912756	10,087244	43
9,801665	9,888651	9,913014	10,086986	42
9,801819	9,888548	9 913271	10,086729	41
9,801973	9,888444	9,913529	10,086471	40
9,802127	9,888341	9,913787	10,086213	39
9,802282	9,888237	9 914044	10,085956	38
9,802435	9,888133	9,914302	10,085698	37
9,802589	9,888030	9,914560	10,085440	36
9,802743	9,887926	9,914817	10,085183	35
9,802897	9,887822	9,915075	10,084925	34
9,803050	9,887718	9,915332	10,084668	33
9,803204	9,887614	9,915590	10,084410	32
9,803357	9,887510	9,915847	10,084153	31
9,803510	9,887406	9,916104	10,083895	30
9,803654	9 887302	9,916362	10,083638	29
9,803817	9,887198	9,916619	10,083381	28
9,803970	9,887093	9,916876	10,083123	27
9,804123	9,887989	9,917134	10,082866	26
9,804276	9,886884	9,917391	10,082609	25
9,804428	9,886780	9,917648	10,082352	24
9,804581	9,886675	9,917905	10,082094	23
9,804734	9,886571	9,918162	10,081837	22
9,804886	9,886466	9,918420	10,081580	21
9,805038	9,886361	9,918677	10,081323	20
9,805191	9,886257	9,918934	10,081066	19
9,805343	9,886152	9,919191	10,080809	18
9,805495	9,886047	9,919448	10 080552	17
9,805647	9,885942	9,919705	10,080295	16
9,805799	9,885837	9,919962	10,080038	15
9,805951	9,885732	9,920219	10,079781	14
9,806103	9,885627	9,920476	10,079524	13
9,806254	9,885521	9,920733	10,079267	12
9,806406	9,885416	9,920990	10,079010	11
9,806557	9,885311	9,921247	10,078753	10
9,806709	9,885205	9,921503	10,078496	9
9,806860	9,885100	9,921760	10,078240	8
9,807011	9 884994	9,922017	10,077983	7
9,807162	9,884889	9,922274.	10,077726	6
9,807314	9,884783	9,922530	10,077469	5
9,807464	9,884677	9,922787	10,077213	4
9,807615	9 884572	9,923044	10 076956	3
9,807766	9,884466	9,923300	10,076699	2
9.867917	9,884360	9,923557	10,076443	1
9,808067	9,884254	9,923813	10,076186	0
Co-ſine	Sine	*Co-tang.*	Tangent,	M
Degree 50.				

	Degree 40.				Degree 41.				
M	Sine	*Co-ſine.*	Tangent,	*Co-tang.*	Sine	*Co-ſine*	Tangent.	*Co-tang.*	
0	9,808067	9,884254	9,923813	10,076186	9,816943	9,877780	9,939163	10,060837	60
1	9,808218	9,884148	9,924070	10,075930	9,817088	9,877670	9,939418	10,060582	59
2	9,808368	9,884042	9,924327	10,075673	9,817233	9,877560	9,939673	10,060327	58
3	9,808519	9,883936	9,924583	10,075417	9,817378	9,877450	9,939928	10,060072	57
4	9,808669	9,883829	9,924839	10,075160	9,817523	9,877340	9,940183	10,059816	56
5	9,808819	9,883723	9,925096	10,074904	9,817668	9,877230	9,940438	10,059562	55
6	9,808969	9,883617	9,925352	10,074647	9,817813	9,877120	9,940693	10,059307	54
7	9,809119	9,883510	9,925609	10,074391	9,817958	9,877009	9,940948	10,059052	53
8	9,809269	9,883404	9,925865	10,074135	9,818103	9,876899	9,941203	10,058797	52
9	9,809419	9,883297	9,926121	10,073878	9,818247	9,876789	9,941458	10,058542	51
10	9,809569	9,883191	9,926378	10,073622	9,818392	9,876678	9,941713	10,058287	50
11	9,809718	9,883084	9,926634	10,073366	9,818536	9,876568	9,941968	10,058032	49
12	9,809868	9,882977	9,926890	10,073110	9,818681	9,876457	9,942223	10,057777	48
13	9,810017	9,882871	9,927147	10,072853	9,818825	9,876347	9,942478	10,057522	47
14	9,810166	9,882764	9,927403	10,072597	9,818969	9,876236	9,942733	10,057267	46
15	9,810316	9,882657	9,927659	10,072341	9,818113	9,876125	9,942988	10,057012	45
16	9,810465	9,882550	9,927915	10,072085	9,819257	9,876014	9,943243	10,056757	44
17	9,810614	9,882443	9,928171	10,071829	9,819401	9,875904	9,943497	10,056502	43
18	9,810763	9,882336	9,928427	10,071573	9,819545	9,875793	9,943752	10,056248	42
19	9,810912	9,882228	9,928683	10,071317	9,819689	9,875682	9,944007	10,055993	41
20	9,810061	9,882121	9,928940	10,071060	9,819832	9,875571	9,944262	10,055738	40
21	9,811210	9,882014	9,929196	10,070804	9,819976	9,875459	9,944517	10,055483	39
22	9,811358	9,881907	9,929452	10,070548	9,820119	9,875348	9,944771	10,055229	38
23	9,811506	9,881799	9,929708	10,070292	9,820263	9,875237	9,945026	10,054974	37
24	9,811655	9,881692	9,929964	10,070036	9,820406	9,875125	9,945281	10,054719	36
25	9,811804	9,881584	9,930219	10,069781	9,820549	9,875014	9,945535	10,054464	35
26	9,811952	9,881477	9,930475	10,069525	9,820693	9,874903	9,945790	10,054210	34
27	9,812100	9,881369	9,930731	10,069269	9,820836	9,874791	9,946045	10,053955	33
28	9,812248	9,881261	9,930987	10,069013	9,820979	9,874679	9,946299	10,053701	32
29	9,812396	9,881153	9,931243	10,068757	9,821122	9,874568	9,946554	10,053446	31
30	9,812544	9,881045	9,931499	10,068501	9,821264	9,874456	9,946808	10,053192	30
31	9,812692	9,880937	9,931755	10,068245	9,821407	9,874344	9,947063	10,052937	29
32	9,812840	9,880829	9,932010	10,067989	9,821550	9,874232	9,947317	10,052682	28
33	9,812988	9,880721	9,932266	10,067734	9,821692	9,874120	9,947572	10,052428	27
34	9,813135	9,880613	9,932522	10,067478	9,821835	9,874008	9,947826	10,052173	26
35	9,813283	9,880505	9,932778	10,067222	9,821977	9,873896	9,948081	10,051919	25
36	9,813430	9,880397	9,933033	10,066967	9,822120	9,873784	9,948335	10,051664	24
37	9,813578	9,880289	9,933289	10,066711	9,822262	9,873672	9,948590	10,051410	23
38	9,813725	9,880180	9,933545	10,066455	9,822404	9,873560	9,948844	10,051156	22
39	9,813872	9,880072	9,933800	10,066200	9,822546	9,873447	9,949099	10,050901	21
40	9,814019	9,879963	9,934056	10,065944	9,822688	9,873335	9,949353	10,050647	20
41	9,814166	9,879855	9,934311	10,065688	9,822830	9,873223	9,949607	10,050393	19
42	9,814313	9,879746	9,934567	10,065433	9,822972	9,873110	9,949862	10,050138	18
43	9,814460	9,879637	9,934822	10,065177	9,823114	9,872998	9,950116	10,049884	17
44	9,814607	9,879529	9,935078	10,064922	9,823255	9,872885	9,950370	10,049630	16
45	9,814753	9,879420	9,935333	10,064666	9,823397	9,872772	9,950625	10,049375	15
46	9,814900	9,879311	9,935589	10,064411	9,823538	9,872659	9,950879	10,049121	14
47	9,815046	9,879202	9,935844	10,064156	9,823680	9,872546	9,951133	10,048867	13
48	9,815193	9,879093	9,936100	10,063900	9,823821	9,872434	9,951388	10,048612	12
49	9,815339	9,878984	9,936355	10,063645	9,823962	9,872321	9,951642	10,048358	11
50	9,815485	9,878875	9,936610	10,063389	9,824104	9,872208	9,951896	10,048104	10
51	9,815631	9,878766	9,936866	10,063134	9,824245	9,872094	9,952150	10,047850	9
52	9,815777	9,878656	9,937121	10,062879	9,824386	9,871981	9,952404	10,047575	8
53	9,815923	9,878547	9,937376	10,062623	9,824527	9,871868	9,952659	10,047341	7
54	9,816069	9,878438	9,937632	10,062368	9,824667	9,871755	9,952913	10,047087	6
55	9,816215	9,878328	9,937887	10,062113	9,824808	9,871641	9,953167	10,046833	5
56	9,816361	9,878219	9,938142	10,061858	9,824949	9,871528	9,953421	10,046579	4
57	9,816506	9,878109	9,938397	10,061602	9,825090	9,871414	9,953675	10,046325	3
58	9,816652	9,877999	9,938653	10,061347	9,825230	9,871301	9,953929	10,046071	2
59	9,816797	9,877890	9,938908	10,061092	9,825370	9,871187	9,954183	10,045817	1
60	9,816943	9,877780	9,939163	10,060837	9,825511	9,871073	9,954437	10,045563	0
	Co-ſine	Sine	*Co-tang.*	Tangent	*Co-ſine*	Sine	*Co-tang.*	Tangent	M
	Degree 49.				Degree 48.				

Degree 42.

M	Sine	Co-ſine.	Tangēt.	Co-tang.
0	9,825511	9,871073	9,954437	10,045562
1	9,825651	9,870960	9,954691	10,045308
2	9,825791	9,870846	9,954945	10,041054
3	9,825931	9,870732	9,955199	10,044800
4	9,826071	9,870618	9,955453	10,044546
5	9,826211	9,870504	9,955707	10,044292
6	9,826351	9,870390	9,955961	10,044038
7	9,826491	9,870275	9,956215	10,043784
8	9,826631	9,870161	9,956469	10,043531
9	9,826770	9,870047	9,956723	10,043276
10	9,826910	9,869933	9,956977	10,043023
11	9,827049	9,869818	9,957231	10,042769
12	9,827189	9,869704	9,957485	10,042515
13	9,827328	9,869589	9,957739	10,042261
14	9,827467	9,869474	9,957993	10,042007
15	9,827606	9,869360	9,958246	10,041753
16	9,827745	9,869245	9,958500	10,041500
17	9,827884	9,869130	9,958754	10,041246
18	9,828023	9,869015	9,959008	10,040992
19	9,828162	9,868900	9,959262	10,040738
20	9,828301	9,868785	9,959515	10,040485
21	9,828439	9,868670	9,959769	10,040231
22	9,828578	9,868555	9,960023	10,039977
23	9,828716	9,868439	9,960277	10,039723
24	9,828855	9,868324	9,960530	10,039469
25	9,828993	9,868209	9,960784	10,039216
26	9,829131	9,868093	9,961038	10,038962
27	9,829269	9,867978	9,961291	10,038608
28	9,829407	9,867862	9,961545	10,038451
29	9,829545	9,867747	9,961799	10,038201
30	9,829683	9,867631	9,962052	10,037947
31	9,829821	9,867515	9,962306	10,037694
32	9,829959	9,867399	9,962560	10,037440
33	9,830096	9,867283	9,962813	10,037187
34	9,830234	9,867167	9,963067	10,036933
35	9,830372	9,867051	9,963320	10,036680
36	9,830509	9,866935	9,963574	10,036426
37	9,830646	9,866819	9,963827	10,036173
38	9,830784	9,866703	9,964081	10,035919
39	9,830921	9,866586	9,964335	10,035665
40	9,831058	9,866470	9,964588	10,035412
41	9,831195	9,866353	9,964842	10,035158
42	9,831332	9,866237	9,965095	10,034905
43	9,831469	9,866120	9,965348	10,034652
44	9,831606	9,866004	9,965602	10,034398
45	9,831742	9,865887	9,965855	10,034144
46	9,831879	9,865770	9,966109	10,033891
47	9,832015	9,865653	9,969362	10,033638
48	9,832152	9,865536	9,966616	10,033384
49	9,832288	9,865419	9 966869	10,033131
50	9,832425	9,865302	9,967122	10,032878
51	9,832561	9,865185	9,967376	10,032624
52	9,832697	9 865068	9,967629	10,032371
53	9,832833	9,864950	9 967883	10,032117
54	9,832969	9,864833	9,968136	10,031864
55	9,833105	9,864716	9,968389	10,031611
56	9,833241	9,864598	9,968643	10,031357
57	9,833376	9,864480	9,968896	10,031104
58	9,833512	9,864363	9,969149	10,030851
59	9,833648	9,864245	9,969403	10,030597
60	9,833783	9,864127	9,969656	10,030344
	Co-ſine	Sine	Co-tang.	Tangent.

Degree 47.

Degree 43

Sine	Co-ſine	Tangēt.	Co-tang.	
9,833783	9,864127	9,969656	10,030344	60
9,833919	9,864010	9,969909	10,030091	59
9,834054	9,863892	9,970162	10,029838	58
9,834189	9,863774	9,970416	10,029584	57
9,834324	9,863656	9 970669	50,029331	56
9,834460	9,863537	9,970922	10,029078	55
9,834595	9,863419	9,971175	10,028827	54
9,834730	9,863301	9,971428	10,028571	53
9,834865	9,863183	9,971682	10,028318	52
9,834999	9,863064	9,971935	10,028065	51
9,835134	9,862946	9,972188	10,027812	50
9,835269	9,862827	9,972441	10,027559	49
9,835503	9,862709	9,972694	10,027306	48
9,835538	9,862590	9,972948	10,027052	47
9,835672	9,862471	9,973201	10,026799	46
9,835806	9,862353	9,973454	10,026546	45
9,835941	9,862234	9,973707	10,026293	44
9,836075	9,862115	9,973960	10,026040	43
9,836209	9,861996	9,974213	10,025787	42
9,836343	9,861877	9,974466	10,025533	41
9,836477	9,861757	9,974719	10,025280	40
9,836611	9,861638	9,974973	10,025027	39
9,836745	9,861519	9,975229	10,024774	38
9,836878	9,861399	9,975479	10,024521	37
9,837012	9,861280	9,975732	10,024268	36
9,837146	9,861161	9,975985	10,024015	35
9,837279	9,861041	9,976238	10,023762	34
9,837412	9,860921	9,976491	10,023509	33
9,837546	9,860802	9,976744	10,023256	32
9,837679	9,860682	9,976997	10,023003	31
9,837812	9,860562	9,977250	10,022750	30
9,837945	9,860442	9,977503	10,022497	29
9,838078	9,860322	9,977756	10,022244	28
9,838211	9,860202	9,978009	10,021991	27
9,838344	9,860082	9,978262	10,021738	26
9,838477	9,859962	9,978515	10,021485	25
9,838609	9,859842	9,978768	10,021232	24
9,838742	9,859721	9,979021	10,020979	23
9,838875	9,859601	9,979274	10,020726	22
9,839007	9,859480	9,979527	10 020473	21
9,839140	9,859360	9,979780	10,020220	20
9,839272	9,859239	9 980033	10,019967	19
9,839484	9,859118	9,980285	10,019714	18
9,839536	9,858998	9,980538	10,019461	17
9,839668	9,858877	9,980791	10,019209	16
9,839800	9,858756	9,981044	10,018956	15
9,839932	9,858639	9,981297	10,018703	14
9,840064	9,858514	9,981550	10,018450	13
9,840196	9,858398	9,981803	10,018197	12
9,840428	9,858272	9,982056	10,017944	11
9,840459	9,858150	9 982309	10,017691	10
9,840591	9,858029	9,982562	10 017438	9
9,840722	9,857908	9,982814	10,017185	8
9,840854	9,857786	9,983067	10,016933	7
9,840985	9,857665	9,983320	10,016680	6
9,841116	9,857543	9,983573	10,016427	5
9,841247	9,857421	9,983826	10,016174	4
9,841378	9,857300	9 984079	10,015921	3
9,841509	9,857178	9 984331	10,015668	2
9,841640	9,857056	9,984584	10,015416	1
9,841771	9,856934	9,984837	10,015163	0
Co-ſine	Sine	Co-tang.	Tangent,	M

Degree 46.

Degree 44.

M	Sine	*Co-ſine.*	Tangēt,	*Co-tang.*	
0	9,841771	9,856934	9,984837	10,015162	60
1	9,841902	9,856812	9,985090	10,014910	59
2	9,842033	9,856690	9,985343	10,014657	58
3	9,842163	9,856568	9,985596	10,014404	57
4	9 842294	9,856445	9,985848	10,014151	56
5	9,842424	9,856323	9,986101	10,013899	55
6	9,842555	9,856201	9,986354	10,013646	54
7	9,842685	9,856078	9,986607	10,013393	53
8	9,842815	9,855956	9,986859	10,013140	52
9	9,842945	9,855833	9,987112	10,012888	51
10	9,843076	9,835710	9,987365	10,012635	50
11	9,843206	9,855588	9,987618	10,012382	49
12	9,843336	9,855465	9,987871	10,012129	48
13	9,843465	9,855342	9,988123	10,011877	47
14	9,843595	9,855219	9 988376	10,011624	46
15	9,843725	9 855096	9,988629	10,011371	45
16	9,843855	9,854973	9,988882	10,011118	44
17	9,843984	9,854850	9,989134	10,010866	43
18	9,844114	9,854727	9,989387	10,010613	42
19	9,844243	9,854603	9,989640	10,010360	41
20	9,844372	9,854480	9,989893	10,010107	40
21	9,844502	9,854356	9,990145	10,009855	39
22	9,844631	9,854233	9,990398	10,009602	38
23	9,844760	9,854109	9,990651	10,009349	37
24	9,844889	9,853986	9,990903	10,009096	36
25	9,845018	9,853862	9,991156	10,008844	35
26	9,845147	9,853738	9,991409	10,008591	34
27	9,845276	9,853614	9,991662	10,008338	33
28	9,845404	9,853490	9,991914	10,008086	32
29	9,845533	9,853366	9,992167	10,007833	31
30	9,845662	9,853242	9,992420	10,007580	30
31	9,845790	9,853118	9,992672	10,007328	29
32	9,845919	9,852994	9,992925	10,007075	28
33	9,846047	9,852869	9,993178	10,006822	27
34	9,846175	9,852745	9,993430	10,006569	26
35	9,846304	9,852620	9,993683	10,006317	25
36	9,846432	9,852496	9,993936	10,006064	24
37	9,846560	9,852371	9,994189	10,005811	23
38	9,846688	9,852246	9,994441	10,005559	22
39	9,846816	9,852122	9,994694	10,005306	21
40	9,846944	9,851997	9.994947	10,005053	20
41	9,847071	9,851872	9,995199	10,004801	19
42	9,847199	9,851747	9,995452	10,004548	18
43	9,847327	9,851622	9,995701	10,004295	17
44	9,847454	9,851497	9,995957	10,004043	16
45	9,847582	9,851372	9,996210	10,003790	15
46	9,847709	9,851246	9 996463	10,003537	14
47	9,847836	9,851121	9,996715	10,003285	13
48	9,847964	9,850996	9 996968	10,003032	12
49	9 848091	9,850870	9,997220	10,002779	11
50	9,848218	9,850745	9,997473	10,002527	10
51	9,848345	9,850619	9,997726	10,002274	9
52	9,848472	9,850493	9,997979	10,002021	8
53	9,848599	9,850367	9,998231	10,001769	7
54	9,848726	9,850242	9,998484	10,001516	6
55	9,848852	9,850116	9 998737	10,001263	5
56	9,848979	9,849990	9 998989	10,001011	4
57	9,849106	9,849864	9,999242	10,001758	3
58	9,849232	9,849737	9,999495	10,000505	2
59	9 849359	9,849611	9,999747	10,000253	1
60	9,849485	9,849485	10,000000	10 000000	0
	Co-ſine	Sine	*Co-tang.*	Tangent	M

Degree 45.

CHILIADES
DECEM
LOGARITHMORUM,

CONTEINING

The LOGARITHMES of all Numbers increaſing by
Naturall ſucceſſion from an Unite to 10000: Whereby the
Logarithmes of all Numbers under 1000000 may
ſpeedily be deduced.

Firſt Calculated by that excellent Mathematician
Mr. HENRY BRIGGS,
Profeſſor of Geometry *in the Univerſity of* Oxford:
And their uſe now much amplified.

By VINCENT WING. *Philomathemat.*

LONDON:
Printed by ROBERT LEYBOURN, for the
Company of STATIONERS, 1651.

The Table of *Logarithmes*.

N	0	1	2	3	4	5	6	7	8	9
1	0,000000	041393	079181	113943	146128	176091	04120	230449	255272	278754
2	0,301030	322219	342423	361728	380211	397940	414973	431364	447158	462398
3	0,477121	491362	505150	518514	531479	504068	556303	568202	579784	591065
4	0,602060	612784	623249	633468	643453	653213	662758	672098	681241	690196
5	0,698970	707570	716003	724276	732394	740363	748188	755875	763428	770852
6	0,778151	785330	792392	799341	806180	812913	819544	826075	832509	838849
7	0,845098	851258	857332	863323	869232	875061	880814	886491	892095	897627
8	0,903090	908485	913814	919078	924279	929419	934498	939519	944483	949390
9	0,954242	959041	963788	968483	973128	977724	982271	986772	991226	995635
10	1,000000	004321	008600	012837	017033	021189	025306	029384	033424	037426
11	1,041393	045323	049218	053078	056905	060698	064458	068186	071882	075547
12	1,079181	082785	086360	089905	093422	096910	100371	103804	107210	110590
13	1,113943	117271	120574	123852	127105	130334	133539	136721	139879	143015
14	1,146128	149219	152288	155336	158362	161368	164353	167317	170262	173186
15	1,176091	178977	181844	184691	187521	190332	193125	195900	198658	201397
16	1,204120	206826	209515	212188	214844	217484	220108	222716	225309	227887
17	1,230449	232996	235528	238046	240549	243038	245513	247973	250420	252853
18	1,255272	257679	260071	262451	264819	267172	269513	271842	274158	276462
19	1,278754	281033	283301	285557	287802	290035	292256	294466	296665	298853
20	1,301030	303196	305351	307496	309630	311754	313867	315970	318063	320146
21	1,322219	324282	326336	328380	330414	332438	334454	336460	338456	340444
22	1,342423	344392	346353	348305	350248	352183	354108	356026	357935	359835
23	1,361728	363612	365488	367356	369216	371068	372912	374748	376577	378398
24	1,380211	382017	383815	385606	387390	389166	390935	392697	394452	396199
25	1,397940	399674	401401	403121	404834	406540	408240	409933	411620	413300
26	1,414973	416641	418301	419956	421604	423246	424882	426511	428185	429752
27	1,431364	432969	434569	436163	437751	439333	440909	442480	444045	445604
28	1,447158	448706	450249	451786	453318	454845	456366	457882	459392	460898
29	1,462398	463893	465383	466868	468347	469822	471292	472756	474216	475671
30	1,477121	478566	480007	481443	482874	484300	485721	487138	488551	489958
31	1,491362	492760	494155	495544	496930	498311	499687	501059	502427	503791
32	1,505150	506505	507856	509203	510545	511883	513218	514550	515874	517196
33	1,518514	519828	521138	522444	523746	525045	526339	527630	528917	530200
34	1,531479	532754	534026	535294	536558	537819	539076	540329	541579	542825
35	1,544068	545307	546543	547775	549003	550228	551450	552668	553883	555094
36	1,556302	557507	558709	559907	561101	562293	563481	564666	565848	567026
37	1,568202	569374	570543	571709	572872	574031	575188	576341	577492	578639
38	1,579783	580925	582063	583199	584331	585461	586587	587711	588832	589950
39	1,591065	592177	593286	594393	595496	596597	597695	598791	599883	600973
40	1,602060	603144	604226	605305	606381	607155	608526	609594	610660	611723
41	1,612784	613842	614897	615950	617000	618048	619093	620136	621176	622214
42	1,623249	624282	625312	626340	627366	628389	629410	630428	631444	632457
43	1,633468	634477	635484	636488	637490	638449	639486	640481	641474	642464
44	1,643453	644439	645422	646404	647383	648360	649335	650308	651278	652246
45	1,653212	654177	655138	656098	657056	658011	658965	659916	660865	661813
46	1,662758	663701	664642	665581	666518	667453	668386	669317	670246	671173
47	1,672098	673021	673942	674861	675778	676694	677607	678518	679428	680336
48	1,681241	682145	683047	683947	684845	685742	686636	687529	688420	689309
49	1,690196	691081	691965	692847	693727	694605	695482	696356	697229	698101
50	1,698970	699838	700704	701568	702431	703291	704151	705008	705864	706718

The Table of *Logarithmes.*

N	0	1	2	3	4	5	6	7	8	9
51	1,707570	708421	709270	710117	710963	711807	712650	713491	714330	715167
52	1,716003	716838	717670	718502	719331	720159	720986	721811	722634	723456
53	1,724276	725095	725912	726727	727541	728354	729165	729974	730782	731589
54	1,732394	733197	733999	734800	735599	736397	737193	737987	738780	739572
55	1,740363	741152	741939	742725	743510	744293	745075	745855	746634	747412
56	1,748188	748963	749736	750508	751279	752048	752816	753583	754348	755112
57	1,755875	756636	757396	758155	758912	759668	760422	761176	761928	762679
58	1,763428	764176	764923	765669	766413	767156	767898	768638	769377	770115
59	1,770852	771587	772321	773055	773786	774517	775246	775974	776701	777427
60	1,778151	778874	779596	780317	781037	781755	782473	783189	789304	784617
61	1,785330	786041	786751	787460	788168	788875	789521	790285	790988	791691
62	1,792392	793092	793790	794488	795185	795880	796574	797268	797960	798651
63	1,799341	800029	800717	801404	802089	802774	803457	804139	804821	805501
64	1,806180	806858	807535	808211	808886	809560	810233	810904	811575	812245
65	1,812913	813581	814248	814913	815578	816241	816904	817565	818226	818885
66	1,819544	820211	820858	821514	822168	822822	823474	824126	824776	825426
67	1,826075	826723	827369	828015	828660	829304	829947	830589	831230	831870
68	1,832509	833147	833784	834421	835056	835691	836324	836957	837588	838219
69	1,838849	839478	840106	840733	841359	841985	842609	843233	843855	844477
70	1,845098	845718	846337	846955	847573	848189	848805	849419	850033	850646
71	1,851258	851870	852480	853090	853698	854306	854913	855519	856124	856729
72	1,857332	857935	858537	859138	859739	860338	860937	861534	862131	862728
73	1,863323	863917	864511	865104	865696	866287	866878	867467	868056	868644
74	1,869232	869818	870404	870989	871573	872156	872739	873321	873902	874482
75	1,875061	875640	876218	876795	877371	877947	878522	879096	879669	880242
76	1,880814	881385	881955	882525	883093	883661	884229	884795	885361	885926
77	1,886491	887054	887617	888179	888741	889302	889862	890421	890980	891537
78	1,892095	892651	893207	893762	894316	894870	895423	895975	896526	897077
79	1,897627	898176	898725	899273	899821	900367	900913	901458	902003	902547
80	1,903089	903633	904174	904716	905256	905796	906335	906874	907411	907949
81	1,908485	909021	909556	910091	910624	911158	911690	912222	912753	913284
82	1,913814	914343	914872	915400	915927	916454	916980	917586	918030	918555
83	1,919078	919601	920123	920645	921166	921686	922206	922725	923244	923762
84	1,924279	924796	925312	925828	926342	926857	927370	927883	928396	928908
85	1,929419	929930	930440	930949	931458	931966	933474	932981	933487	933993
86	1,934498	935003	935507	936011	936514	937016	937518	938019	938520	939020
87	1,939519	940018	940516	941014	941511	942008	942504	943000	943495	943989
88	1,944483	944976	945469	945961	946452	946943	947434	947924	948413	948902
89	1,949390	949878	950365	950851	951338	951823	952308	952792	953276	953760
90	1,954242	954725	955207	955688	956168	956649	957128	957607	958086	958564
91	1,959041	959518	959995	960471	960946	961421	961895	962369	962843	963316
92	1,963788	964260	964731	965202	965672	966142	966611	967080	967548	968016
93	1,968483	968950	969416	969882	970347	970812	971276	971740	972203	972666
94	1,973128	973590	974051	974512	974972	975432	975891	976350	976808	977266
95	1,977724	978181	978637	979093	979548	980003	980458	980912	981366	981819
96	1,982271	982723	983175	983626	994077	984527	984977	985426	985875	986324
97	1,986772	987219	987666	988113	988559	989005	989450	989895	990339	990783
98	1,991226	991669	992111	992554	992995	993436	993877	994317	994757	995196
99	1,995635	996074	996512	996949	997386	897823	998259	998695	999131	999565
100	2,000000	000434	000868	001301	001734	002166	002598	003029	003461	003891

The Table of *Logarithmes*.

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101	004321	004751	005181	005609	006038	006466	006894	007321	007748	008174
102	008600	009026	009451	009876	010299	010724	011147	011570	011993	012415
103	012837	013259	013679	014100	014521	014940	015359	015779	016197	016616
104	017033	017451	017868	018284	018700	019116	019532	019947	020361	020775
105	021189	021603	022016	022428	022841	023252	023664	024075	024486	024896
106	025306	025715	026125	026533	026942	027349	027757	028164	028571	028978
107	029384	029789	030195	030599	031004	031408	031812	032216	032619	033021
108	033424	033826	034227	034628	035029	035429	035829	036229	036629	037028
109	037426	037825	038223	038620	039017	039414	039811	040207	040602	040998
110	041393	041787	042182	042576	042969	043362	043755	044148	044539	044932
111	045323	045714	046105	046495	046885	047275	047664	048053	048442	048830
112	049218	049603	049993	050379	050766	051153	051538	051924	052309	052694
113	053078	053466	053846	054229	054613	054996	055378	055760	056142	056524
114	056905	057283	057666	058046	058426	058805	059185	059563	059942	060320
115	060698	061075	061452	061829	062206	062582	062958	063333	063709	064083
116	064458	064832	065206	065579	065953	066326	066699	067071	067443	067815
117	068186	068557	068928	069298	069668	070038	070407	070776	071145	071514
118	071882	072249	072617	072985	073352	073718	074085	074451	074816	075182
119	075547	075912	076276	076640	077004	077368	077731	078094	078457	078819
120	079181	079543	079904	080266	080626	080987	081347	081707	082067	082426
121	082785	083144	083503	083861	084219	084576	084934	085291	085647	086004
122	086359	086716	087071	087426	087781	088136	088490	088845	089198	089552
123	089905	090258	090610	090963	091315	091667	092018	092369	092721	093071
124	093422	093772	094122	094471	094820	095169	095518	095866	096215	096562
125	096910	097257	097604	097951	098298	098644	098989	099335	099681	100026
126	100371	100715	101050	101403	101747	102091	102434	102777	103119	103462
127	103804	104146	104487	104828	105169	105510	105851	106191	106531	106871
128	107209	107549	107888	108227	108565	108903	109241	109579	109916	110253
129	110589	110926	111263	111599	111934	112269	112605	112939	113275	113609
130	113943	114277	114611	114944	115278	115611	115943	116276	116608	116939
131	117271	117603	117934	118265	118595	118926	119256	119586	119915	120245
132	120574	120903	121231	121559	121888	122216	122544	122871	123198	123525
133	123852	124178	124504	124830	125156	125481	125806	126131	126456	126781
134	127105	127429	127753	128076	128399	128722	129045	129368	129689	130012
135	130334	130655	130977	131298	131619	131939	132259	132579	132899	133219
136	133539	133858	134177	134496	134814	135133	135451	135769	136086	136403
137	136721	137037	137354	137671	137987	138303	138618	134934	139249	139564
138	139879	140194	140508	140822	141136	141449	141763	142076	142389	142702
139	143015	143327	143639	143951	144263	144574	144885	145196	145507	145818
140	146128	146438	146748	147058	147367	147676	147985	148294	148603	148911
141	149219	149527	149835	158142	150449	150756	151063	151369	151676	151982
142	152288	152594	152899	153205	153509	153815	154119	154423	154728	155032
143	155336	155639	155943	156246	156549	156852	157154	157457	157759	158061
144	158362	158664	158965	159266	159567	159868	160168	160469	160767	161068
145	161368	161667	161967	162266	162564	162863	163161	163459	163758	164055
146	164353	164650	164947	165244	165541	165838	166134	166430	166726	167022
147	167317	167613	167908	168203	168497	168792	169086	169380	169674	169968
148	170262	170555	170848	171141	171434	171726	172019	172311	172603	172895
149	173186	173478	173769	174059	174351	174641	174932	175222	175512	175802
150	176091	176381	176669	176959	177248	177536	177825	178113	178401	178689

The Table of *Logarithmes*.

N	0	1	2	3	4	5	6	7	8	9
151	178977	179264	179552	179839	180126	180413	180699	180986	181272	181558
152	181844	182129	182415	182699	182985	183269	183555	183839	184123	184407
153	184691	184975	185259	185542	185825	186108	186391	186674	186956	187239
154	187521	187803	188084	188366	188647	188928	189209	189490	189771	190051
155	190332	190612	190892	191171	191451	191730	192009	192289	192567	192846
156	193125	193403	193681	193959	194237	194514	194792	195069	195346	195623
157	195899	196176	196453	196729	197005	197281	197556	197832	198107	198382
158	198657	198932	199206	199481	199755	200029	200303	200577	200850	201124
159	201397	201670	201943	202216	202488	202761	203033	203305	203577	203848
160	204119	204391	204663	204934	205204	205475	205746	206016	206286	206556
161	206826	207096	207365	207364	207904	208173	208441	208710	208978	209247
162	209515	209783	210051	210319	210586	210853	211121	211388	211654	211921
163	212187	212454	212720	212986	213252	213518	213783	214049	214314	214579
164	214844	215109	215373	215638	215902	216166	216429	216694	216957	217221
165	217484	217747	218010	218273	218536	218798	219060	219323	219585	219846
166	220108	220369	220631	220892	221153	221414	221675	221936	222196	222456
167	222716	222976	223236	223496	223755	224015	224274	224533	224791	225051
168	225309	225568	225826	226084	226342	226599	226858	227115	227372	227629
169	227887	228142	228400	228657	228913	229169	229426	229682	229938	230193
170	230449	230704	230959	231215	231469	231724	231979	232234	232488	232742
171	232996	233250	233504	233757	234011	234264	234517	234770	235023	235276
172	235528	235781	236033	236285	236537	236789	237041	237292	237544	237795
173	238046	238297	238548	238799	239049	239299	239549	239799	240049	240299
174	240549	240799	241048	241297	241546	241795	242044	242293	242541	242789
175	243038	243286	243534	243782	244029	244277	244525	244772	245019	245266
176	245513	245759	246006	246252	246499	246745	246991	247237	247482	247728
177	247973	248219	248464	248709	248954	249198	249443	249687	249932	250176
178	250420	250664	250908	251151	151395	251638	251881	252125	252368	152610
179	252853	253096	253334	253580	253822	254064	254306	254548	254789	255031
180	255273	255514	255755	255996	256237	256477	256718	256958	257198	257438
181	257679	257918	258158	258398	258637	258877	259116	250355	259594	259833
182	260071	260309	260548	260787	261025	261263	261501	261739	261976	262214
183	262451	262688	262925	263162	263399	263366	263873	264109	264346	264582
184	264818	265054	265289	265525	265761	265996	266232	266467	266702	266937
185	267172	267406	267641	267875	268109	268344	268578	268812	269046	269279
186	269513	269746	269979	270213	270446	270679	270912	271144	271377	271609
187	271842	272074	272306	272538	272769	273001	273233	273464	273696	273927
188	274158	274389	274619	274850	275081	275311	275542	275772	276002	276232
189	276462	276692	276921	277151	277379	277609	277838	278067	278296	278525
190	278754	278982	279211	279439	279667	279895	280123	280351	280578	280806
191	281033	281261	281488	281714	281942	282169	282396	282622	282849	283075
192	283301	283527	283753	283979	284205	284431	284656	284882	285107	285332
193	285557	285782	286007	286232	286456	286681	286905	287129	287354	287578
194	287802	288026	288249	288473	288696	288919	289143	289366	289589	289812
195	290035	290257	290479	290702	290925	291147	291369	291591	291813	292034
196	292256	292478	292699	292920	293141	293362	293584	293804	294025	294246
197	294466	294687	294907	295127	295347	295567	295787	296007	296226	296446
198	296665	296884	297104	297323	297542	297761	297979	298198	298416	298635
199	298853	299071	299289	299507	299725	299943	300161	300378	300595	300813
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203	307496	307709	307924	308137	308351	308564	308778	308991	309204	309417
204	309630	309843	310056	310268	310481	310693	310906	311118	311329	311542
205	311754	311966	312177	312389	312600	312812	313023	313234	313445	313656
206	313867	314078	314289	314499	314709	314920	315130	315340	315551	315760
207	315970	316180	316389	316599	316809	317018	317227	317436	317646	317854
208	318063	318272	318481	318689	318898	319106	319314	319522	319730	319938
209	320146	320354	320562	320769	320977	321184	321391	321598	321805	322012
210	322219	322426	322633	322839	323046	323252	323458	323665	323871	324077
211	324282	324488	324694	324899	325105	325310	325516	325721	325926	326131
212	326336	326541	326745	326949	327155	327359	327563	327767	327972	328176
213	328379	328583	328787	328991	329194	329398	329601	329805	330008	330211
214	330414	330617	330819	331022	331225	331427	331629	331832	332034	332236
215	332438	332640	332842	333044	333246	333447	333649	333850	334051	334253
216	334454	334655	334856	335057	335257	335458	335658	335859	336059	336259
217	336459	336659	336859	337059	337259	337459	337659	337859	338058	338257
218	338456	338656	338856	339054	339253	339453	339650	339849	340047	340246
219	340444	340642	340841	341039	341237	341435	341632	341830	342028	342225
220	342227	342620	342817	343014	343212	343409	343606	343802	343999	344196
221	344392	344589	344785	344981	345178	345737	345569	345766	345962	346157
222	346353	346549	346744	346939	347135	347330	347525	347720	347915	348110
223	348305	348499	348694	348889	349083	349278	349472	349659	349860	350054
224	350248	350442	350636	350829	351023	351216	351409	351603	351796	351989
225	352183	352375	352568	352761	352954	353147	353339	353532	353724	353916
226	354108	354301	354493	354685	354876	355068	355259	355452	355643	355834
227	356026	356217	356408	356599	356792	356981	357172	357363	357554	357744
228	357935	358125	358316	358506	358696	358886	359076	359266	359456	359646
229	359835	360025	360215	360404	360593	360783	360972	361161	361350	361539
230	361728	361917	362105	362294	362482	362671	362859	363048	363236	363424
231	363612	363799	363988	364176	364363	364551	364739	364926	365113	365301
232	365488	365675	365862	366049	366236	366423	366609	366796	366983	367169
233	367356	367542	367729	367915	368101	368287	368473	368659	368845	369030
234	369216	369401	369587	369772	369958	370143	370328	370513	370698	370882
235	371068	371253	371437	371622	371806	371991	372175	372359	372544	372728
236	372912	373096	373279	373464	373647	373831	374015	374198	374382	374565
237	374748	374932	375115	375298	375481	375664	375846	376029	376212	376394
238	376577	376159	376942	377124	377306	377488	377670	377852	378034	378216
239	378398	378579	378761	378943	379124	379306	379487	379668	379849	380030
240	380211	380392	380573	380754	380934	381115	381296	381476	381656	381837
241	382017	382197	382377	382557	382737	382917	383097	383277	383456	383636
242	383815	383995	384174	384353	384533	384712	384891	385069	385249	385428
243	385606	385785	385964	386142	386321	386499	386677	386856	387034	387212
244	387389	387568	387746	387923	388101	388279	388456	388634	388811	388989
245	389166	389343	389520	389598	389875	390051	390228	390405	390582	390759
246	390935	391112	391288	391464	391641	391817	391993	392169	392345	392521
247	392697	392873	393048	393224	393399	393575	393751	393926	394101	394277
248	394452	394627	394802	394977	395152	395326	395501	395676	395850	396025
249	396199	396374	396548	396722	396896	397071	397245	397419	397592	397766
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252	401401	401573	401745	401917	402089	402261	402433	402605	402777	402949
253	403121	403292	403464	403635	403807	403978	404149	404320	404492	404663
254	404834	405005	405176	405346	405517	405688	405858	406029	406199	406369
255	406540	406710	406881	407051	407221	407391	407561	407731	407901	408070
256	408239	408409	408579	408749	408918	409087	409257	409426	409595	409764
257	409933	410102	410271	410439	410609	410777	410946	411114	411283	411451
258	411619	411788	411956	412124	412293	412461	412629	412796	412964	413132
259	413299	413467	413635	413803	413969	414137	414305	414472	414639	414806
260	414973	415140	415307	415474	415641	415808	415974	416141	416308	416474
261	416641	416807	416973	417139	417306	417472	417638	417804	417969	418135
262	418301	418467	418633	418798	418964	419129	419295	419460	419625	419791
263	419956	420121	420286	420451	420616	420781	420945	421110	421275	421439
264	421604	421768	421933	422097	422261	422426	422589	422754	422918	423082
265	423246	423409	423574	423737	423901	424065	424228	424392	424555	424718
266	424882	425045	425208	425371	425534	425697	425860	426023	426186	426349
267	426511	426674	426836	426999	427161	427324	427486	427648	427811	427973
268	428135	428297	428459	428621	428783	428944	429106	429268	429429	429591
269	429752	429914	430075	430236	430398	430559	430719	430881	431042	431203
270	431364	431525	431685	431846	432007	432167	432328	432488	432649	432809
271	432969	433129	433289	433449	433609	433769	433929	434089	434249	434409
272	434569	434729	434888	435048	435207	435366	435526	435685	435844	436004
273	436163	436322	436481	436639	436799	436957	437116	437275	437433	437592
274	437751	437909	438067	438226	438384	438542	438701	438859	439017	439175
275	439333	439491	439648	439806	439964	440122	440279	440437	440594	440752
276	440909	441066	441224	441381	441538	441695	441852	442009	442166	442323
277	442479	442637	442793	442949	443106	443263	443419	443576	443732	443889
278	444045	444201	444357	444513	444669	444825	444981	445137	445293	445449
279	445604	445759	445915	446071	446226	446382	446537	446692	446848	447003
280	447158	447313	447468	447623	447778	447932	448088	448242	448397	448552
281	448706	448861	449015	449169	449324	449478	449633	449787	449941	450095
282	450249	450403	450557	450711	450865	451018	451172	451326	451479	451633
283	451786	451939	452093	452247	452399	452553	452706	452859	453012	453165
284	453318	453471	453624	453777	453929	454082	454235	454387	454539	454692
285	454845	454997	455149	455302	455454	455606	455758	455910	456062	456214
286	456366	456518	456669	456821	456973	457125	457276	457428	457579	457731
287	459889	458033	458184	458336	458487	458638	458789	458939	459091	459242
288	459392	459543	459694	459845	459995	460146	460296	460447	460597	460748
289	460898	461048	461198	461348	461499	461649	461799	461948	462098	462248
290	462398	462548	462697	462847	462997	463146	463296	463445	463594	463744
291	463893	464042	464191	464340	464489	464639	464787	464936	465085	465234
292	465383	465532	465680	465829	465977	466126	466274	466423	466571	466719
293	466868	467016	467164	467312	467460	467608	467756	467904	468052	468199
294	468347	468495	468643	468790	468798	469085	469233	469380	469527	469675
295	469822	469969	470116	470263	470410	470557	470704	470851	470998	471145
296	471292	471438	471585	471732	471878	472025	472171	472318	472464	472610
297	472756	472903	473049	473195	473341	473487	473633	473779	473925	474071
298	474216	474362	474508	474653	474799	474944	475089	475235	475381	475526
199	475671	475816	475962	476107	476252	476397	476542	476687	476832	476976
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303	481443	481586	481729	481872	482016	482159	482302	482445	482588	482731
304	482874	483016	483159	483302	483445	483587	483729	483872	484015	484157
305	484299	484442	484585	484727	484869	485011	485153	485295	485437	485579
306	485721	485863	486005	486147	486289	486430	486572	486714	486855	486997
307	487138	487279	487421	487563	487704	487845	487986	488127	488269	488409
308	488551	488692	488833	488974	489114	489255	489396	489537	489677	489818
309	489958	490099	490239	490379	490520	490661	490801	490941	491081	491222
310	491362	491502	491642	491782	491922	492062	492201	492341	492481	492621
311	492760	492900	493039	493179	493319	493458	493597	493737	493876	494015
312	494155	494294	494433	494572	494711	494850	494989	495128	495267	495406
313	495544	495683	495822	495960	496099	496238	496376	496515	496653	496791
314	496929	497068	497206	497344	497483	497621	497759	497897	498035	498173
315	498311	498448	498586	498724	498862	498999	499137	499275	499412	499549
316	499687	499824	499962	500099	500236	500374	500510	500648	500785	500922
317	501059	501196	501333	501470	501607	501744	501880	502017	502154	502291
318	502427	502564	502700	502837	502973	503109	503246	503382	503518	503655
319	503791	503927	504063	504199	504335	504471	504607	504743	504878	505014
320	505149	505286	505421	505557	505693	505828	505964	506099	506234	506369
321	506505	506640	506776	506911	507046	507181	507316	507451	507586	507721
322	507856	507991	508126	508260	508395	508529	508664	508799	508934	509068
323	509203	509337	509471	509606	509740	509874	510009	510143	510277	510411
324	510545	510679	510813	510941	511081	511215	511349	511482	511616	511749
325	511883	512017	512151	512284	512418	512551	512684	512818	512951	513084
326	513218	513351	513484	513617	513750	513883	514016	514149	514282	514415
327	514548	514681	514813	514946	515079	515211	515344	515476	515609	515741
328	515874	516006	516139	516271	516403	516535	516668	516799	516932	517064
329	517196	517328	517459	517592	517724	517855	517987	518119	518251	518382
330	518514	518646	518777	518909	519040	519171	519303	519434	519566	519697
331	519828	519959	520090	520221	520353	520484	520615	520745	520876	521007
332	521138	521269	521399	521530	521661	521792	521922	522053	522183	522314
333	522444	522575	522705	522835	522966	523096	523226	523356	523486	523616
334	523746	523876	524006	524136	524266	524396	524526	524656	524785	524915
335	525045	525174	525304	525434	525563	525693	525822	525951	526081	526210
336	526339	526469	526598	526727	526856	526985	527114	527243	527372	527501
337	527629	527759	527888	528016	528145	528274	528402	528531	528659	528788
338	528916	529045	529174	529302	529430	529559	529687	529815	529943	530072
339	530199	530328	530456	530584	530712	530839	530968	531096	531223	531351
340	531479	531607	531734	531862	531989	532117	532245	532372	532499	532627
341	532754	532882	533009	533136	533264	53339	533518	533645	533772	533899
342	534026	534153	534280	534407	534534	534661	534787	534914	535041	535167
343	535294	535421	535547	535674	535800	535927	536053	536179	536304	536432
344	536558	536685	536811	536937	537063	537189	537315	537441	537567	537693
345	537819	537945	538071	538197	538322	538448	538574	538699	538825	538951
346	539076	539202	539327	539452	539578	539703	539829	539954	540079	540204
347	540329	540455	540579	540705	540829	540955	541079	541205	541329	541454
348	541579	541704	541829	541953	542078	542203	542327	542452	542576	542701
349	542825	542949	543074	543199	543323	543447	543571	543696	543819	543944
350	544068	544192	544316	544440	544564	544688	544812	544934	545059	545183

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353	547775	547898	548021	548144	548267	548389	548512	548635	548758	548881
354	549003	549126	549249	549371	549494	549616	549739	549861	549984	550106
355	550228	550351	550473	550595	550717	550839	550962	551084	551206	551328
356	551449	551572	551694	551816	551938	552059	552181	552303	552425	552547
357	552668	552789	552911	553033	553155	553276	553398	553519	553640	553762
358	553883	554004	554126	554247	554368	554489	554610	554731	554852	554973
359	555094	555215	555336	555457	555578	555699	555819	555940	556061	556182
360	556303	556423	556544	556664	556785	556905	557626	557146	557267	557387
361	557507	557627	557748	557868	557988	558108	558228	558349	558469	558589
362	558709	558829	558948	559068	559188	559308	559428	559548	559667	559787
363	559907	560026	560146	560265	560385	560504	560624	560743	560863	560982
364	561101	561221	561339	561459	561578	561698	561817	561936	562055	562174
365	562293	562412	562531	562649	562769	562887	563006	563125	563244	563362
366	563481	563599	563718	563837	563955	564074	564192	564311	564429	564548
367	564666	564784	564903	565021	565139	565257	565376	565494	565612	565729
368	565848	565966	566084	566202	566319	566437	566555	566673	566791	566909
369	567026	567144	567262	567379	567497	567614	567732	567849	567967	568084
370	568202	568319	568436	568554	568671	568788	568905	569023	569139	569257
471	569374	569491	569608	569725	569842	569959	570076	570193	570309	570426
372	570543	570659	570776	570893	571009	571126	571243	571359	571476	571592
373	571709	571825	571942	572058	572174	572291	572407	572523	572639	572755
374	572872	572988	573104	573219	573336	573452	573568	573684	573799	573915
375	574031	574147	574263	574379	574494	574609	574726	574841	574957	575072
376	575188	575303	575419	575534	575649	575765	575880	575996	576111	576226
377	576341	576457	576572	576687	576802	576917	577032	577147	577292	577377
378	577492	577607	577722	577836	577951	578066	578181	578295	578409	578525
379	578639	578754	578868	578983	579097	579212	579326	579441	579555	579669
380	579784	579898	580012	580126	580241	580355	580469	580583	580697	580811
381	580925	581039	581153	581267	581381	581495	581608	581722	581836	581949
382	582063	582177	582291	582404	582518	582631	582745	582858	582972	583085
383	583199	583426	583312	583539	583652	583765	583879	583992	584105	584218
384	584331	584444	584587	584670	584783	584896	585009	585122	585235	585348
385	585461	585574	585686	585799	585912	586024	586137	586249	586362	586475
386	586587	586699	586812	586925	587037	587149	587262	587374	587486	587599
387	587711	587823	587935	588047	588159	588272	588384	588496	588608	588719
388	588832	588944	589056	589167	589279	589391	589503	589615	589726	589838
389	589949	590061	590173	590284	590396	590507	590619	590730	590842	590953
390	591065	591176	591287	591399	591509	591621	591732	591843	591955	592066
391	592177	592288	592399	192509	592621	592732	592843	592954	593064	593175
392	593286	593397	593508	593618	593729	593839	593950	594061	594171	594282
393	594393	594503	594614	594724	594834	594945	595055	595165	595276	595386
394	595496	595606	595717	595827	195937	596047	596157	596267	596377	596487
395	596597	596707	596817	596927	597037	597146	597256	597366	597476	597586
396	597695	597805	597914	598024	598134	598243	598353	598462	598572	598681
397	598790	598899	599009	599119	599228	599337	599446	599556	599665	599774
398	599883	599992	600101	600210	600319	600428	600537	600646	600755	600864
399	600973	601082	601191	601299	601408	601517	601625	601734	601843	601951
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403	605305	605413	605521	605628	605736	605844	605951	606059	606166	606274
404	606381	606489	606596	606704	606811	606919	607026	607133	607241	607348
405	607455	607562	607669	607777	607884	607991	608098	608205	608312	608419
406	608526	608633	608739	608847	608954	609061	609167	609274	609381	609488
407	609594	609701	609808	609914	610021	610128	610234	610341	610447	610554
408	610660	610767	610873	610979	611086	611192	611298	611405	611511	611617
409	611723	611829	611936	612042	612148	612254	612359	612466	612572	612678
410	612784	612889	612996	613102	613207	613313	613419	613525	613630	613736
411	613842	613947	614053	614159	614264	614369	614475	614581	614686	614792
412	614897	615003	615108	615213	615319	615424	615529	615634	615739	615845
413	615950	616055	616160	616265	616370	616476	616581	616686	616790	616895
414	617000	617105	617210	617315	617419	617525	617629	617734	617839	617943
415	618048	618153	618257	618362	618466	618571	618676	618780	618884	618989
416	619093	619198	619302	619406	619511	619615	619719	619824	619928	620032
417	620136	620240	620344	620448	620552	620656	620760	620864	620968	621072
418	621176	621280	621384	621448	621592	621695	621799	621902	622007	622110
419	622214	622317	622421	622525	622628	622732	622835	622939	623042	623146
420	623249	623353	623456	623559	623663	623766	623869	623973	624076	624179
421	624282	624385	624488	624591	624695	624798	624901	625004	625107	625209
422	625312	625415	625518	625621	625724	625827	625929	626032	626135	626237
423	626340	626443	626545	626648	626751	626853	626956	627058	627161	627263
424	627366	627468	627571	627673	627775	627878	627979	628082	628185	628287
425	628389	628491	628593	628695	628797	628899	629002	629104	629206	629308
426	629409	629512	629613	629715	629817	629919	630021	630123	630224	630326
427	630428	630529	630631	630733	630835	630936	631038	631139	631241	631342
428	631444	631545	631647	631748	631849	631951	632052	632153	632255	632356
429	632457	632559	632659	632761	632862	632963	633064	633165	633266	633367
430	633468	633569	633670	633771	633872	633973	634074	634175	634276	634376
431	634477	634578	634679	634779	634880	634981	635081	635182	635283	635383
432	635484	635584	635685	635785	635886	635986	636087	636187	636288	636388
433	636488	636588	636688	636789	636889	636989	637089	637189	637289	637389
434	637489	637589	637689	637789	637889	637989	638089	638189	638289	638389
435	638489	638589	638689	638789	638888	638988	639088	639188	639287	639387
436	639486	639586	639686	639785	639885	639984	640084	640183	640283	640382
437	640481	640581	640680	640779	640879	640978	641077	641177	641276	641375
438	641475	641573	641672	641771	641871	641969	642069	642168	642267	642366
439	642465	642563	642662	642761	642860	642959	643058	643156	643255	643354
440	643453	643551	643650	643749	643847	643946	644044	644143	644242	644340
441	644439	644537	644636	644734	644832	644931	645029	645127	645226	645324
442	645422	645521	645619	645717	645815	645913	646011	646109	646208	646306
443	646404	646502	646599	646698	646796	646894	646992	647089	647187	647285
444	647383	647481	647579	647676	647774	647872	647969	648067	648165	648262
445	648360	648458	648555	648653	648750	648848	648945	649043	649140	649237
446	649335	649432	649529	649627	649724	649821	649919	650016	650113	650210
447	650308	650405	650502	650599	650696	650793	650890	650987	651084	651181
448	651278	651375	651472	651569	651666	651762	651859	651956	652053	652149
449	652246	652343	652439	652536	652633	652729	652826	652923	653019	653116
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453	656098	656194	656289	656386	656482	656577	656673	656769	656864	656960
454	657056	657152	657247	657343	657438	657534	657629	657725	657820	657916
455	658011	658107	658202	658298	658393	658488	658584	658679	658774	658869
456	658965	659060	659155	659250	659346	659441	659536	659631	659726	659821
457	659916	660011	660106	660201	660296	660391	660486	660581	660676	660771
458	660865	660960	661055	661149	661245	661339	661434	661529	661623	661718
459	661813	661907	662002	662096	662191	662286	662380	662475	662569	662663
460	662758	662852	662947	663041	663135	663229	663324	663418	663512	663607
461	663701	663795	663889	663983	664078	664172	664266	664359	664454	664548
462	664642	664736	664829	664924	665018	665112	665206	665299	665393	665487
463	665581	665675	665769	665862	665956	666049	666143	666237	666331	666424
464	666518	666611	666705	666799	666892	666986	667079	667173	667266	667359
465	667453	667546	667639	667733	667826	667919	668013	668106	668199	668293
466	668386	668479	668572	668665	668759	668852	668945	669038	669131	669224
467	669317	669409	669503	669596	669689	669782	669875	669967	676060	670153
468	670246	670339	670431	670524	670617	670709	670802	670895	670988	671080
469	671173	671265	671358	671451	671543	671637	671728	671821	671913	632005
470	672098	672190	672283	672375	672467	672559	672652	672744	672836	672929
471	673021	673113	673205	673297	673389	673482	673574	673666	673758	673849
472	673942	674034	674126	674218	674309	674402	674494	674586	674677	674769
473	674861	674953	675045	675137	675228	675319	675412	675503	675595	675687
474	675778	675869	675962	676053	676145	676236	676328	676419	676511	676602
475	676694	676785	676876	676968	677059	677151	677242	677333	677424	677516
476	677507	677698	677789	677881	677972	678063	678154	678245	678335	678427
477	678518	678609	678700	678791	678882	678973	679064	679155	679246	979337
478	679428	679519	679609	679700	679791	679882	679972	680063	680154	680245
479	680336	680426	680517	680607	680698	680789	680879	680969	681060	681151
480	681241	681332	681422	681513	681603	681693	681784	681874	681964	682055
481	682145	682235	682326	682416	682506	682596	682686	282777	682867	682957
482	683047	683137	683227	683317	683407	683497	683587	683677	683767	683857
483	683947	684037	684127	684217	684307	684396	684486	684576	684666	684756
484	684845	684935	685025	685114	685204	685294	685383	685473	685563	685652
485	685742	685831	685921	686010	686099	686189	686279	686368	686458	686547
486	686636	686726	686815	646904	686994	687083	687172	687261	687351	687439
487	687529	687618	687707	687796	687885	687975	688064	688153	688242	688331
488	688419	688509	688598	688687	688776	688865	688953	689042	689131	689200
489	689309	689398	689486	689575	689664	689753	689841	689930	690019	690107
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491	691081	691169	691258	691347	691435	691524	691612	691700	691789	691877
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494	693727	693815	693903	693991	694078	694166	694254	694342	694429	694517
495	694605	694693	694781	694868	694956	695044	695131	695219	695307	695394
496	695482	695569	695657	695744	695832	695919	696007	696094	696182	696269
497	696356	696445	696531	696618	696706	696793	696880	696968	697055	697142
498	697229	697317	697404	697491	697578	697665	697752	697839	697926	698014
499	698101	698188	698275	698362	698449	698535	698622	698709	698706	698883
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503	701568	701654	701741	701827	701913	701999	702086	702172	702258	702344
504	702430	702517	702603	702689	702775	702861	702947	703033	703119	703205
505	703291	703377	703463	703549	703635	703721	703807	703893	703979	704065
506	704151	704236	704322	704408	704494	704579	704665	704751	704837	704922
507	705008	705094	705179	705265	705350	705436	705522	705607	705693	705778
508	705864	705949	706035	706120	706206	706291	706376	706462	706547	706632
509	706718	706803	706888	706974	707059	707144	707219	707315	707399	707485
510	707570	707655	707740	707826	707911	707996	708081	708166	708251	708336
511	708421	708506	708591	708676	708761	708846	708931	709015	709100	709185
512	709269	709355	709439	709524	709609	709694	709779	709863	709948	710033
513	710117	710202	710287	710371	710456	710540	710625	710709	710794	710879
514	710963	711048	711132	711217	711301	711385	711469	711554	711639	711723
515	711807	711892	711976	712060	712144	712229	712313	712397	712481	712566
516	712649	712734	712818	712902	712986	713070	713154	713238	713323	713407
517	713491	713575	713659	713742	713826	713910	713994	714078	714162	714246
518	714329	714414	714497	714581	714665	714749	714833	714916	714999	715084
519	715167	715251	715335	715418	715501	715586	715669	715753	715836	715919
520	716003	716087	716170	716254	716337	716421	716504	716588	716671	716754
521	716838	716921	717004	717088	717171	717254	717338	717421	717504	717587
522	717671	717754	717837	717920	718003	718086	718169	718253	718336	718419
523	718502	718585	718668	718751	718834	718917	718999	719083	719165	719248
524	719331	719414	719497	719579	719663	719745	719828	719911	719994	720077
525	720159	720242	720325	720407	720490	720673	720655	720738	720821	720903
526	720986	721068	721151	721233	721316	721398	721481	721563	721646	721728
527	721811	721893	721975	722058	722140	722222	722305	722387	722469	722552
528	722634	722716	722798	722881	722963	723045	723127	723209	723291	723374
529	723456	723538	723619	723702	723784	723866	723948	724029	724112	724194
530	724276	724358	724439	724522	724604	724685	724767	724849	724931	725013
531	725095	725176	725258	725339	725422	725503	725585	725667	725748	725829
532	725912	725993	726075	726156	726238	726319	726401	726483	726564	726646
533	726727	726809	726890	726972	727053	727134	727216	727297	727379	727459
534	727541	727623	727704	727785	727866	727948	728029	728110	728191	728273
535	728354	728435	328516	728597	728678	728759	728841	728922	729003	729084
536	729165	729246	729327	729408	729489	729569	729651	729732	729813	729893
537	729974	730055	730136	730217	730298	730378	730459	730540	730621	730702
538	730782	730862	730944	731024	731105	731186	731266	731347	731428	731508
539	731589	731669	731749	731830	731911	731991	732072	732152	732233	732313
540	732394	732474	732555	732635	732715	732796	732876	732956	733037	733117
541	733197	733278	733358	733438	733518	733598	733679	733759	733839	733919
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545	736397	736476	736556	736635	736715	736795	736874	736954	737034	737113
546	737192	737272	737352	737431	737511	737590	737669	737749	737829	737908
547	737987	738067	738146	738225	738305	738384	738463	738543	738622	738701
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549	739572	739651	739731	739809	739885	739963	740047	740126	740205	740284
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554	743509	743588	743667	743745	743823	743902	743979	744058	744136	744215
555	744293	744371	744449	744528	744606	744684	744762	744840	744919	744997
556	745075	745153	745231	745309	745387	745465	745543	745621	745699	745777
557	745855	745933	746011	746089	746167	746245	746323	746401	746479	746556
558	746634	746712	746789	746868	746945	747023	747101	747179	747256	747334
559	747412	747489	747567	747645	747722	747800	747878	747955	748033	748110
560	748188	748266	748343	748421	748498	748576	748653	748731	748808	748885
561	748963	749040	749118	749195	749272	749349	749423	749504	749582	749659
562	749736	749814	749891	749968	750045	750123	750199	750277	750354	750431
563	750508	750586	750663	750739	750817	750894	750971	751048	751125	751202
564	751279	751356	751433	751510	751587	751664	751741	751818	751895	751972
565	752048	752125	752202	752279	752356	752433	752509	752586	752663	752739
566	752816	752893	752969	753047	753123	753199	753277	753353	753429	753506
567	753583	753659	753736	753813	753889	753966	754042	754119	754195	754272
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571	756636	756712	756788	756864	756940	757016	757092	757168	757244	757320
572	757396	757472	757548	757627	757699	757775	757851	757927	758003	758079
573	758155	758230	758306	758382	758458	758533	758609	758685	758761	758836
574	758912	758988	759063	759139	759214	759290	759366	759441	759517	759592
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578	761928	762003	762078	762153	762228	762303	762378	762453	762529	762604
579	762679	762754	762829	762904	762978	763053	763128	763203	763279	763353
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581	764176	764251	764326	764400	764475	764549	764624	764699	764774	764808
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583	765669	765743	765818	765892	765966	766041	766115	766189	766264	766338
584	766413	766487	766562	766636	766710	766785	766859	766933	767007	767082
585	767156	767230	767304	767379	767453	767527	767601	767675	767749	767823
586	767898	767972	768046	768119	768194	768268	768342	768416	768490	768564
587	768638	768712	768786	768860	768934	769008	769082	769156	769229	769303
588	769377	769451	769525	769599	769673	769746	769820	769894	769968	770042
589	770115	770189	770263	770336	770410	770484	770557	770631	770705	770778
590	770852	770926	770999	771073	771146	771219	771293	771367	771440	771514
591	771587	771661	771734	771808	771881	771955	772028	772102	772175	772248
592	772322	772395	772468	772542	772615	772688	772762	772835	772908	772981
593	773055	773128	773201	773274	773348	773421	773494	773567	773640	773713
594	773786	773859	773933	774006	774079	774152	774225	774298	774371	774444
595	774517	774589	774663	774736	774809	774882	774955	775028	775100	775173
596	775246	775319	775392	775465	775538	775610	775683	775756	775829	775902
597	775974	776047	776119	776193	776265	776338	776411	776483	776556	776629
598	776701	776774	776846	776919	776992	777064	777137	777209	777282	777354
599	777427	777499	777572	777644	777717	777789	777862	777934	778006	778079
600	778151	778224	778296	778368	778441	778513	778585	778658	778729	778802

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602	779596	779669	779741	779813	779885	779957	780029	780101	780173	780245
603	780317	780389	780461	780533	780605	780677	780749	780821	780893	780963
604	781037	781109	781181	781253	781324	781396	781468	781539	781612	781684
605	781755	781827	781899	781971	782042	782114	782186	782258	782329	782401
606	782473	782544	782616	782688	782759	782831	782902	782974	783046	783117
607	783189	783260	783332	783403	783475	783546	783618	783689	783761	783832
608	783904	783975	784046	784118	784189	784261	784332	784403	784475	784546
609	784617	784689	784759	784831	784902	784974	785045	785116	785187	785259
610	785329	785401	785472	785543	785615	785686	785757	785828	785899	785970
611	786041	786112	786183	786254	786325	786396	786467	786538	786609	786680
612	786751	786822	786893	786964	787035	787106	787177	787248	787319	787389
613	787460	787531	787602	787673	787744	787815	787885	787956	788027	788098
614	788164	788239	788309	788381	788451	788522	788593	788663	788734	788804
615	788875	788946	789016	789087	789157	789228	789299	789369	789439	789510
616	789581	789651	789722	789792	789863	789933	790004	790074	790144	790215
617	790285	790356	790426	790496	790567	790637	790707	790778	790848	790918
618	790988	791059	791129	791199	791269	791339	791409	791480	791550	791620
619	791691	791761	791831	791901	791971	792041	792111	792181	792252	792322
620	792392	792462	792532	792602	792672	792742	792812	792882	792952	793022
621	793092	793162	793231	793301	793371	793441	793511	793581	793651	763721
622	793791	793860	793930	793999	794069	794139	794209	794279	794349	794418
623	794488	794558	794627	794697	794767	794836	794906	794976	795045	795115
624	795185	795254	795324	795393	795463	795532	795602	795672	795741	795810
625	795880	795949	796019	796088	796158	796227	796297	796366	796436	796505
626	796574	796644	796713	796782	796852	796921	796990	797059	797129	797198
627	797268	797337	797406	797475	797545	797614	797683	797752	797821	797890
628	797959	798029	798098	798167	798236	798305	798374	798443	798513	798582
629	798651	798719	798789	798858	798927	798996	799065	799134	799003	799272
630	799341	799409	799478	799547	799616	799685	799754	799823	799892	799961
631	800029	800098	800167	800236	800305	800373	800442	800511	800579	800648
632	800717	800786	800854	800923	800992	801061	801129	801198	801266	801335
633	801404	801472	801541	801609	801678	801747	801815	801884	801952	802021
634	802089	802158	802226	802295	802363	802432	802500	802568	802637	802705
635	802774	802842	802910	802979	803047	803116	803184	803252	803321	803389
636	803457	803525	803594	803662	803730	803798	803867	803935	804003	804071
637	804139	804208	804276	804344	804412	804480	804548	804616	804685	804753
638	804821	804889	804957	805025	805093	805161	805229	805297	806365	805433
639	805501	805569	805637	805705	805773	805841	805908	805976	806044	806112
640	806179	806248	806316	806384	806451	806519	806587	806655	806723	806790
641	806858	806926	806994	807061	807129	807197	807264	807332	807399	807467
642	807535	807603	807670	807738	807806	807873	807941	808008	808076	808143
643	808211	808279	808346	808414	808481	808549	808616	808684	808751	808818
644	808886	808953	809021	809088	809156	809223	809290	809358	809425	809492
645	809559	809627	809694	809762	809829	809896	809964	810031	810098	810165
646	810233	810299	810367	810434	810501	810569	810636	810703	810770	810837
647	810904	810971	811039	811106	811173	811239	811307	811374	811441	811508
648	811575	811642	811709	811776	811843	811909	811977	812044	812111	812178
649	812245	812312	812379	812445	812512	812579	812646	812713	812779	812847
650	812913	812980	813047	813114	813181	813247	813314	813381	813448	813514

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652	814248	814314	814381	814447	814514	814581	814647	814714	814780	814847
653	814913	814979	815046	815113	815179	815246	815312	815378	815445	815511
654	815578	815644	815711	815777	815843	815909	815976	816042	816109	816175
655	816241	816308	816374	816440	816506	816573	816639	816705	816771	816838
656	816904	816970	817036	817102	817169	817235	817301	817367	817433	817499
657	817565	817631	817698	817764	817829	817896	817962	818028	818094	818159
658	818226	818292	818358	818424	818489	818556	818622	818688	818754	818819
659	818885	818951	819017	819083	819149	819215	819281	819346	819412	819478
660	819543	819609	819676	819741	819807	819873	819939	820004	820070	820136
661	820201	820267	820333	820399	820464	820529	820595	820661	820727	820792
662	820858	820924	820989	821055	821120	821186	821251	821317	821382	821448
663	821514	821579	821645	821709	821775	821841	821906	821972	822037	822103
664	822168	822233	822299	822364	822429	822495	822560	822626	822691	822756
665	822822	822887	822952	823018	823083	823148	823213	823279	823344	823409
666	823474	823539	823605	823669	823735	823800	823865	823930	823996	824061
667	824126	824191	824256	824321	824386	824451	824516	824581	824646	824711
668	824776	824841	824906	824971	825036	825101	825166	825231	825296	825361
669	825426	825491	825556	825621	825686	825751	825815	825880	825945	826009
670	826075	826139	826204	826269	826334	826399	826464	826528	826593	826658
671	826723	826787	826852	826917	826981	827046	827111	827175	827239	827305
672	827369	827434	827499	827563	827628	827692	827757	827822	827886	827951
673	828015	828079	828144	828209	828273	828338	828402	828467	828531	828595
674	828659	828724	828789	828853	828918	828982	829046	829111	829175	829239
675	829304	829368	829432	829497	829561	829625	829689	829754	829818	829882
676	829947	830011	830075	830139	830204	830268	830332	830396	830460	830525
677	830589	830653	830717	830781	830845	830909	830973	831037	831102	831166
678	831229	831294	831358	831422	831485	831549	831614	831678	831742	831806
679	831869	831934	831998	832062	832126	832189	832253	832317	832381	832445
680	832509	832573	832636	832700	832764	832828	832892	832956	833019	833083
681	833147	833211	833275	833338	833402	833466	833529	833593	833657	833721
682	833784	833848	833912	833975	834039	834103	834166	834229	834294	834357
683	834421	834584	834548	834611	834675	834739	834802	834866	834929	834993
684	835056	835119	835183	835247	835310	835373	835437	835500	835564	835627
685	835691	835754	835817	835881	835944	836007	836071	836134	836197	836261
686	836324	836387	836451	836514	836577	836641	836704	836767	836830	836894
687	836957	837019	837083	837146	837209	837273	837336	837399	837462	837525
688	837588	837652	837715	837777	837841	837904	837967	838030	838093	838156
689	838219	838282	838345	838408	838471	838534	838597	838660	838723	838786
690	838849	838912	838975	839038	839101	839164	839227	839280	839352	839415
691	839478	839541	839604	839667	839729	839792	839855	839918	839981	840043
692	840106	840169	840232	840204	840357	840419	840482	840545	840608	840671
693	840733	840796	840859	840921	840984	841049	841119	841172	841234	841297
694	841359	841423	841485	841547	841609	841672	841735	841797	841859	841922
695	841985	842047	842109	842172	842235	842297	842359	842432	842484	842547
696	842609	842672	842734	842796	842859	842921	842983	843046	843108	843170
697	843233	843295	843357	843419	843482	843544	843606	843669	843731	843793
698	843855	843918	843979	844042	844104	844166	844229	844291	844353	844415
699	844477	844539	844601	844664	844726	844788	844849	844912	844974	845036
700	845098	845160	845222	845284	845346	845408	845470	845532	845594	845656

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703	846955	847017	847079	847141	847202	847264	847326	847388	847449	847511
704	847573	847634	847696	847758	847819	847881	847943	848004	848067	848128
705	848189	848251	848312	848374	848435	848497	848559	848620	848682	848743
706	848805	848866	848928	848989	849051	849112	849171	849235	849297	849358
707	849419	849481	849542	849604	849665	849726	849788	849849	849911	849972
708	850033	850095	850156	850217	850279	850339	850401	850462	850524	850585
709	850646	850707	850769	850829	850891	850952	851014	851075	851136	851197
710	851258	851319	851381	851442	851503	851564	851625	851686	851747	851809
711	851869	851931	851992	852053	852114	852175	852236	852297	852358	852419
712	852479	852541	852602	852663	852724	852785	852846	852907	852968	853029
713	853089	853150	853211	853272	853333	853394	853455	853516	853577	853637
714	853698	853759	853819	853881	853941	854002	854063	854124	854185	854245
715	854306	854367	854428	854488	854549	854609	854670	854731	854792	854852
716	854913	854974	855034	855095	855156	855216	855277	855337	855398	855459
717	855519	855579	855640	855701	855761	855822	855882	855943	856003	856064
718	856124	856185	856245	856306	856366	856427	856487	856548	856608	856668
719	856729	856789	856849	856910	856970	857031	857091	857152	857212	857272
920	857332	857393	857453	857513	857574	857634	857694	857755	857815	857875
721	857935	857995	858056	858116	858176	858236	858297	858357	858417	858477
722	858537	858597	858657	858718	858778	858838	858898	858958	859018	859078
723	859138	859198	859258	859318	859379	859439	859499	859559	859619	859679
724	859739	859799	859859	859918	859978	860038	860098	860158	860218	860278
725	860338	860398	860458	860518	860578	860637	860697	860757	860817	860877
726	860937	860996	861056	861116	861176	861236	861295	861355	861415	860475
727	861534	861594	861654	861714	861773	861733	861893	861952	862012	862072
728	862131	862191	862251	862310	862369	862429	862489	862549	862608	862662
729	862728	862787	862847	862906	862966	863025	863085	863144	863204	863263
730	863323	863382	863442	863501	863561	863620	863679	863739	863799	863858
731	863917	863977	864036	864096	864155	864214	864274	864333	864392	864452
732	864511	864570	864629	864689	864748	864808	864867	864926	864985	865045
733	865104	865163	865222	865282	865341	865400	865459	865519	865578	865637
734	865696	865755	865814	865874	865933	865992	866051	866110	866169	866228
735	866287	866346	866405	866465	866524	866583	866642	866701	866759	866819
736	866878	866937	866996	867055	867114	867173	867232	867291	867349	867409
737	867467	867526	867585	867644	867703	867762	867821	867879	867939	867998
738	868056	868115	868174	868233	868292	868350	868409	868468	868527	868586
739	868643	868704	868762	868821	868879	868938	868997	869056	869114	869173
740	869232	869290	869349	869408	869466	869525	869584	869642	869701	869759
741	869818	869877	869935	869994	870053	870111	870169	870228	870287	870345
742	870404	870462	870521	870579	870638	870696	870755	870813	870872	870930
743	870989	871047	871106	871164	871223	871281	871339	871398	871456	871515
744	871573	871631	871689	871748	871806	871865	871923	871981	872039	872098
745	872156	872215	872273	872331	872389	872448	872506	872564	872622	872681
746	872739	872797	872855	872913	872972	873029	873088	873146	873204	873262
747	873321	873379	873437	873495	873553	873611	873669	873727	873785	873844
748	873902	873959	874018	874076	874134	874192	874249	874308	874366	874424
749	874482	874539	874598	874656	874714	874772	874829	874888	874945	875003
750	875061	875119	875177	875235	875293	875351	875409	875466	875524	875582

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753	876795	876853	876910	876968	877026	877083	877141	877199	877256	877314
754	877371	877429	877487	877544	877602	877659	877717	877774	877832	877889
755	877947	878004	878062	878119	878177	878234	878292	878349	878407	878464
756	878522	878579	878637	878694	878752	878809	878866	878924	878981	879039
757	879096	879153	879211	879268	879325	879383	879439	879497	879555	879612
758	879669	879726	879784	879841	879898	879013	870013	880070	880127	880185
759	880242	880299	880356	880413	880471	880527	880585	880642	880699	880756
760	880814	880871	880928	880985	881042	881099	881156	881213	881271	881328
761	881385	881442	881499	881556	881613	881669	881727	881784	881841	881898
762	881955	882012	882069	882126	882183	882239	882297	882354	882411	882468
763	882525	882581	882638	882695	882752	882809	882866	882923	882979	883037
764	883093	883050	883207	883264	883321	883377	883434	883494	883548	883605
765	883661	883718	883775	883832	883888	883945	884002	884059	884115	884172
766	884229	884285	884342	884399	884455	884512	884569	884625	884682	884739
767	884795	884852	884909	884965	885022	885078	885135	885192	885248	885305
768	885361	885418	885474	885531	885587	885644	885700	885757	885813	885869
769	885926	885983	886039	886096	886152	886209	886265	886321	886378	886434
770	886491	886547	886604	886659	886716	886772	886829	886885	886941	886998
771	887054	887111	887167	887223	887279	887336	887392	887449	887505	887561
772	887617	887674	887729	887786	887842	887898	887955	888011	888067	888123
773	888179	888236	888292	888348	888404	888460	888516	888573	888629	888685
774	888741	888797	888853	888909	888965	889021	889077	889134	889189	889246
775	889302	889358	889414	889469	889526	889582	889638	889694	889749	889806
776	889862	889918	889974	890029	890086	890141	890197	890253	890309	890365
777	890421	890477	890533	890589	890645	890700	890756	890812	890868	890924
778	890979	891035	891091	891147	891203	891259	891314	891370	891426	891482
779	891537	891593	891649	891705	891760	891816	891872	891928	891983	892039
780	892095	892150	892206	892262	892317	892373	892429	892484	892539	892595
781	892651	892707	892762	892819	892873	892929	892985	893040	893096	893151
782	893207	893262	893318	893373	893429	893484	893539	893595	893651	893706
783	893762	893817	893873	893928	893984	894039	894094	894149	894205	894261
784	894316	894371	894427	894482	894538	894593	894648	894704	894759	894814
785	894869	894925	394980	895036	895091	895146	895201	895257	895312	895367
786	895423	895478	895533	895588	895644	895699	895754	895809	895864	895919
787	895975	896029	896085	896140	896195	896251	896306	896361	896416	896471
788	896526	896581	896636	896692	896747	896802	896857	896912	896967	897022
789	897077	897132	897187	897242	897297	897352	897407	897462	897517	897572
790	897627	897682	897737	897792	897847	897902	897957	898012	898067	898122
791	898176	898231	898286	898341	898396	898451	898506	898561	898615	898670
792	898725	898780	898835	898889	898944	898999	899054	899109	899164	899218
794	899273	899328	899383	899437	899492	899547	899602	899656	899711	899766
793	899821	899875	899929	899985	900039	900094	900149	900203	900258	900312
795	900367	900422	900476	900531	900586	900640	900695	900749	900804	900859
796	900913	900968	901022	901077	901131	901186	901240	901295	901349	901404
797	901458	901513	901567	901622	901676	901731	901785	901839	901894	901948
798	902003	902057	902112	902166	902221	902275	902329	902384	902438	902492
799	902547	902601	902655	902709	902764	902818	902873	902927	902981	903036
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802	904174	904229	904283	904337	904391	904445	904499	904553	904607	904661
803	904716	904769	904824	904878	904932	904986	905039	905094	905148	905202
804	905256	905310	905364	905418	905472	905526	905580	905634	905688	905742
805	905796	905849	905904	905958	906012	906066	909119	906173	906227	906281
806	906335	906389	906443	906497	906551	906604	996658	906712	906766	906819
807	906874	906927	907981	907035	907089	907143	907196	907250	907304	907358
808	907411	907465	907519	907573	907626	907680	907734	907787	907841	907895
809	907949	908002	908056	908109	908163	908217	908270	908324	908378	908431
810	908485	908539	908592	908646	908699	908753	908807	908860	908914	908967
811	909021	909074	909128	909181	909235	909289	909342	909396	909449	909503
812	909556	909609	909663	909716	909769	909823	909877	909930	909984	910037
813	910091	910144	910197	910251	910304	910358	910411	910464	910518	910571
814	910624	910678	910731	910784	910838	910891	910944	910998	911051	911104
815	911158	911211	911263	911317	911371	911424	911477	911530	911584	911637
816	911690	911743	911797	911849	911903	911956	912009	912063	912116	912169
817	912222	912275	912323	912381	912435	912488	912541	912594	912647	912700
818	912753	912806	912859	912913	912966	913019	913072	913125	913178	913231
819	913284	913337	913389	913443	913496	913549	913602	913655	913708	913761
820	913814	913867	913919	913973	914026	914079	914132	914184	914237	914290
821	914343	914396	914449	914502	914555	914608	914660	914713	914766	914819
822	914872	914925	914977	915030	915083	915136	915189	915241	915294	915347
823	915399	915453	915505	915558	915611	915664	915716	915769	915822	91587
824	915927	915979	916033	916085	916138	916191	916243	916296	916349	91640
825	916454	916507	916559	916612	916664	916717	916769	916822	916875	916927
826	916980	917033	917085	917138	917190	917243	917295	917348	917400	917453
827	917506	917558	917611	917663	917716	917768	917820	917873	917925	917978
828	918030	918083	918135	918188	918240	918293	918345	918397	918449	918502
829	918555	918607	918659	918712	918764	918816	918869	918921	918973	919026
830	919078	919130	919183	919235	919287	919339	919392	919444	919496	919549
831	919601	919653	919706	919758	919810	919862	919914	919967	920019	920071
832	920123	920176	920228	920279	920332	920384	920436	920489	920541	920593
833	920645	920697	920749	920801	920853	920906	920958	921009	921062	921114
834	921166	921218	921270	921322	921374	921426	921478	921530	921582	921634
835	921686	921738	921790	921842	921894	921946	921998	922050	922102	922154
836	922206	922258	922310	922362	922414	922466	922518	922569	922622	922674
837	922725	922777	922829	922881	922933	922985	923037	923089	923140	923192
838	923244	923296	923348	923399	923451	923503	923555	923607	923658	923710
839	923762	923814	923865	923917	923969	924021	924072	924124	924176	924228
840	924279	924331	924383	924434	924486	924538	924589	924641	924693	924744
841	924796	924848	924899	924951	925003	925054	925106	925157	925209	925261
842	925312	925364	925415	925467	925518	925569	925621	925673	925725	925776
843	925828	925879	925931	925982	926034	926085	926137	926188	926239	926291
844	926342	926394	926445	926497	926548	926599	926651	926702	926754	926805
845	926857	926908	926959	927011	927062	927114	927165	927216	727268	927319
846	927370	927422	927473	927524	927576	927627	927678	927729	927781	927832
847	927883	927935	927986	928037	928088	928139	928191	928242	928293	928345
848	928396	928447	928498	928549	928601	928652	928703	928754	928805	928857
849	928908	928959	929009	829061	929112	929163	929215	929266	929317	929368
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853	930949	930999	931051	931102	931153	931204	931254	931305	931356	931407
854	931458	931509	931559	931610	931661	931712	931763	931814	931865	931915
855	931966	932017	932068	932118	932169	932220	932271	932322	932372	932423
856	932474	932524	932575	932626	932677	932727	932778	932829	932879	932930
857	932981	933031	933082	933133	933183	933234	933285	933335	933386	933437
858	933487	933539	933589	933639	933689	933740	933791	933841	933892	933943
859	933993	934044	934094	934145	934195	934246	934296	934347	934397	934448
860	934498	934549	934599	934649	934700	934751	934801	934852	934902	934953
861	935003	935056	935104	935154	935205	935255	935306	935356	935406	935457
862	935507	935558	935608	935658	935709	935759	935809	935859	935910	935960
863	936011	936061	936111	936162	936212	936262	936313	936363	936413	936463
864	936514	936564	936614	936665	936715	936765	936815	936815	936916	936966
865	937016	937066	937117	937167	937217	937268	937327	937367	937418	937468
866	937518	937568	937618	937668	937718	937769	937819	937869	937919	937969
867	938019	938069	938119	938169	938219	938269	938319	938369	938419	938469
868	938519	938569	938619	938669	938719	938769	938819	938869	938919	938969
869	939019	939069	939114	939169	939219	939269	939319	939369	939419	939469
870	939519	939569	939619	939669	939719	939769	939819	939869	939919	939969
871	940018	940068	940188	940168	940218	940267	940317	940367	940417	940467
872	940516	940566	940616	940666	940716	940765	940813	940865	940915	940964
873	941014	941065	941114	941663	941213	941263	941313	941362	941412	941462
874	941511	941561	941611	941660	941710	941759	941809	941859	941909	941958
875	942008	942058	942107	942157	942207	942256	942306	942355	942405	942455
876	942504	942554	942603	942653	942702	942752	942801	942851	942901	942950
877	942999	943049	943099	943148	943198	943247	943297	943346	943396	943445
878	943495	943544	943594	943643	943692	943742	943791	943841	943890	943939
879	943989	944038	944088	944137	944186	944236	944285	944335	944384	944433
880	944483	944532	944581	944631	944680	944729	944779	944828	944877	944927
881	944976	945025	945074	945124	945173	945222	945272	945321	945370	945419
882	945468	945518	945567	945616	945665	945715	945764	945813	945862	945912
883	945961	946009	946054	946108	946157	946207	946256	946305	946354	946403
884	946452	946501	946551	946599	946649	946698	946747	946796	946845	946894
885	946943	946992	947041	947090	947139	947189	947238	947287	947336	947385
886	947434	947483	947532	947581	947629	947679	947728	947777	947826	947875
887	947924	947973	948022	948070	948119	948168	948217	948266	948315	948364
888	948413	948462	948511	948559	948609	948657	948706	948755	948804	948853
889	948902	948951	948999	949048	949097	949146	949195	949244	949292	949341
890	949390	949439	949488	949536	949585	949633	949683	949731	949780	949829
891	949878	949926	949975	950024	950073	950121	950170	950219	950267	950316
892	950365	950414	950462	950511	950559	950608	950657	950706	950754	950803
893	950851	950900	950949	950997	951046	951095	951143	951192	951240	951289
894	951338	951386	951435	951483	951532	951580	951629	951677	951729	951775
895	951823	951872	951920	951969	952017	952066	952114	952163	952211	952259
896	952308	952356	952405	952453	952502	952550	952599	952647	952696	952744
897	952792	952841	952889	952938	952986	953034	953083	953131	953179	953228
898	953276	953325	953373	953421	953469	953518	953566	953615	953663	953711
899	953759	953808	953856	953905	953953	954001	954049	954099	954146	954194
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903	955688	955736	955784	955832	955880	955928	955976	956024	956072	956120
904	956168	956216	956265	956313	956361	956409	956457	956505	956553	956601
905	956640	956697	956745	956793	956840	956888	956936	656984	957032	957080
906	957128	957176	957224	957272	957319	957368	957716	957464	957512	957559
907	957607	957655	957703	957751	957799	957847	957894	957942	957990	958038
908	958086	958134	958181	958229	958277	958325	958373	958421	958468	958516
909	958564	958612	958659	958707	958755	958803	958850	958898	958946	958994
910	959041	959089	959137	959185	959232	959279	959328	959375	959423	959471
911	959518	959566	959614	959661	959709	959757	959804	959852	959899	959947
912	959995	960042	960090	960138	960185	960233	960280	960328	960376	960423
913	960471	960518	960566	960613	960661	960709	960756	960804	960851	960899
914	960946	960994	961041	961089	961136	961184	961231	961279	961326	961374
915	961421	961469	961516	961563	961611	961658	961706	961753	961801	961848
916	961895	961943	961990	962038	962085	962132	962179	962227	962275	962322
917	962369	962417	962464	962511	962559	962605	962653	962701	962748	962795
918	962842	962889	962937	962985	963032	963079	963126	963174	963228	963268
919	963315	963363	963410	963457	963504	963552	963599	963646	963693	963741
920	963788	963835	963882	963929	963977	964024	964071	964118	964165	964212
921	964259	964307	964354	964401	964448	964495	964542	964589	964637	964684
922	964731	964778	964825	964872	964919	964966	965013	965061	965108	965156
923	965202	965249	965296	965343	965389	965437	965484	965531	965578	965624
924	965672	965719	965766	965813	965859	965906	965954	966001	966048	966096
925	966142	966189	966239	956283	966329	966376	966423	966470	966517	966564
926	966611	966658	966705	966752	966799	966845	966892	966939	966986	967033
927	967079	967127	967173	967220	967267	967314	967361	967408	967454	967501
928	967548	967595	967642	967688	967735	967782	967829	967875	967922	967969
929	968016	968062	968109	968156	968202	968249	968296	968343	968389	968436
930	968483	968529	968576	968623	968669	968716	968763	968809	968856	968902
931	968949	968996	969043	969089	969136	969183	969229	969276	969323	969369
932	969416	969463	969509	969556	969602	969649	969695	969741	969789	969835
933	969882	969928	969975	970021	970068	970114	970161	970207	970254	970300
934	970347	970393	970439	970486	970533	970579	970626	970672	970719	970765
935	970812	970858	970904	970951	970997	971044	971090	971137	971183	971229
936	971276	971322	971369	971416	971461	971508	971554	971601	971647	971653
937	971739	971786	971832	971879	971925	971971	972018	972064	972110	972157
938	972203	972249	972295	972342	972388	972434	972481	972527	972573	972619
939	972666	972712	972758	972804	972851	972897	972943	972989	973036	973082
940	973128	973174	973220	973266	973313	973359	973405	973451	973497	973543
941	973589	973636	973682	973728	973774	973820	973866	973913	973959	974005
942	974050	974097	974143	974189	974235	974281	974327	974374	974419	974466
943	974512	974558	974604	974649	974695	974742	974788	974834	974879	974926
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945	975432	975478	975524	975569	975616	975662	975707	975753	975799	975845
946	975891	975937	975983	976029	976075	976121	976167	976212	976258	976304
947	976349	976396	976442	976488	976533	976579	976625	976671	976717	976763
948	976808	976854	975899	976946	976992	977037	977083	977129	977175	977220
949	977266	977312	977358	977403	977449	977495	977541	977586	977632	977678
950	977724	977769	977815	977861	977906	977952	977998	978043	978089	978135

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953	979093	979138	979184	979229	979275	979321	979366	979412	979457	979503
954	979548	979594	979639	979685	979730	979776	979821	979867	979912	979958
955	980003	980049	980094	980139	980185	980231	980276	980322	980367	980412
956	980458	980503	980549	980594	980639	980685	980730	980776	980821	980867
957	980912	980957	981003	981048	981093	981139	981184	981229	981275	981320
958	981366	981411	981456	981501	981547	981592	981637	981683	981728	981773
959	981819	981864	981909	981954	981999	982045	982090	982135	982181	982226
960	982271	982316	982362	982407	982452	982497	982543	982588	982633	982678
961	982723	982767	982814	982859	982904	982949	982994	983039	983085	983129
962	983175	983220	983265	983310	983356	983401	983446	983490	983536	983581
963	983626	983671	983716	983762	983807	983852	983897	983942	983987	984032
964	984077	984122	984167	984212	984257	984302	984347	984392	984437	984482
965	984527	984572	984617	984662	984707	984752	984797	984842	984887	984932
966	984977	985022	985067	985112	985157	985202	985247	985292	985337	985382
967	985426	985471	985516	985561	985606	985651	985696	985741	985786	985830
968	985875	985920	985965	986009	986055	986099	986144	986189	986234	986279
969	986324	986369	986413	986458	986504	986548	986593	986637	986682	986727
970	986772	986817	986861	986906	986951	986996	987040	987085	987129	987175
971	987219	987264	987309	987353	987398	987443	987488	987532	987577	987622
972	987666	987711	987756	987800	987845	987889	987934	987979	988024	988068
973	988113	988157	988202	988247	988291	988336	988381	988425	988469	988514
974	988559	988604	988648	988693	988737	988782	988826	988871	988916	988960
975	989005	989049	989094	989138	989183	989227	989272	989316	989361	989405
976	989449	989494	989539	989584	989628	989672	989717	989761	989806	989850
977	989895	989939	989983	990028	990072	990117	990161	990206	990250	990294
978	990339	990383	990428	990472	990516	990561	990605	990649	990694	990738
979	990783	990827	990871	990916	990960	991004	991049	991093	991137	991182
980	991226	991270	991315	991359	991403	991448	991492	991536	991580	991625
981	991669	991713	991758	991802	991846	991890	991935	991979	992023	992067
982	992111	992156	992109	992244	992288	992333	992377	992421	992465	992509
983	992554	992598	992642	992686	992730	992774	992819	992863	992907	992951
984	992995	993039	993083	993127	993172	993216	993259	993304	993348	993392
985	993436	993480	993524	993568	993613	993657	993701	993745	993789	993833
986	993877	993921	993965	994009	994053	994097	994141	994185	994229	994273
987	994317	994361	994405	994449	994493	994537	994581	994625	994669	994713
988	994756	994801	994845	994889	994933	994977	995021	995065	995108	995152
989	995196	995240	995284	995328	995372	995416	995459	995504	995547	995591
990	995635	995679	995723	995764	995811	995854	995898	995942	995986	996029
991	996074	996117	996161	996205	996249	996293	996337	996380	996424	996468
992	996512	996555	996599	996643	996687	996731	996774	996818	996862	996905
993	996949	996993	997037	997080	997124	997168	997212	997255	997290	997343
994	997386	997430	997474	997517	997561	997605	997648	997692	997736	997779
995	997823	997867	997910	997954	997998	998041	998085	998129	998172	998216
996	998259	998303	998347	998390	998434	998477	998521	998564	998608	998652
997	998695	998739	998783	998826	998869	998913	998956	998999	999043	999087
998	999133	999174	999218	999261	999305	999348	999392	999435	999479	999522
999	999565	999609	999652	999696	999739	999783	999826	999866	999913	999956
1000	000000	000043	000087	000130	000174	000217	000260	000304	000347	000391

FINIS.

Propositions
Astronomical

of Declination

Declination of any planet ſtar or point in the Heavens is its diſtance either towards the North or South from the Æquinoctial

The declination of any particular point of the ecliptic is found out by computing wt proportion the greateſt declination of the ecliptic beares to 90 degrees for the ſame proportion muſt the declination ſought bear to the diſtance of the point propoſed from the firſt degree of ♈ ſo that the greateſt degree of the declination of the Ecliptic being 23°–31′ if we deſire to know the declination of 30 deg of ♉ we muſt work by the rule of proportion and ſay —— As 90 deg: is to 23–31 ſo is 60 (being the diſtance of the 30 deg of ♉ from the firſt of ♈) to a fourth number which will be 20–13 the declination ſought. but

To find the declination of any other point of the Heavens that hath Latitude from the Ecliptic you muſt beſides its Longitude (anſwering to any point of the ecliptique) have its Latitude alſo